Underground Natural Gas Storage - Rule and FAQs

1. FAQ 22 - Safety Risk Analysis and Assessment *What is the timeline for conducting and completing the safety risk analyses and risk assessments for each storage facility and all related wells?* (UNGS.RULE.FAQ22TIMELINE.P) 192.12(d) (192.12(b))

2. FAQ 22 - Prioritization Based on Safety Risk Analysis *Are risk assessments for each storage facility and related wells prioritized based on the results of the safety risk analyses?* (UNGS.RULE.FAQ22PRIORITIES.P) 192.12(d) (192.12(b))

3. FAQ 22 - Addressing Safety Concerns Based on Safety Risk Analysis Ranking *Are safety concerns addressed based on the ranking of the safety risk analyses?* (UNGS.RULE.FAQ22RANKING.P) 192.12(d) (192.12(b))

4. FAQ 27 - Drug and Alcohol Testing Program *Is there a Drug and Alcohol testing program in place that meets the requirements of 49 CFR Part 199?* (UNGS.RULE.FAQ27DRUGTEST.P) 199.1

Underground Natural Gas Storage - Reporting

1. Definition of Incident *How does the operator define an incident?* (UNGS.RPT.INCIDENTDEFN.P) 191.15(c) (191.3)

2. Incident Reporting - Immediate *Is there a process to immediately report incidents to the National Response Center?* (UNGS.RPT.IMMEDREPORT.P) 191.5(a) (191.5(b), 191.3)

3. Incident Reporting - Immediate *Do records indicate immediate notifications of incidents were made in accordance with 191.5?* (UNGS.RPT.IMMEDREPORT.R) 191.5(a) (191.5(b);191.3)

4. Incident Reporting - Procedures *What are the procedures in place for reporting a storage facility incident soon as practicable but no later than 30 days after discovery of a reportable incident?* (UNGS.RPT.INCIDENTREPORT.P) 191.15(c) (191.3)

5. Incident Reporting - Procedures *Do records indicate reportable incidents were identified and reports were submitted to DOT on Form 7100.2 within the required time frame?* (UNGS.RPT.INCIDENTREPORT.R) 191.15(c) (191.3)

6. Incident Reporting - Supplemental *What are the procedures in place for preparing and filing supplemental incident reports?* (UNGS.RPT.INCIDENTREPORTSUPP.P) 191.15(d) (191.15(c))

7. Incident Reporting - Supplemental *Do records indicate accurate supplemental incident reports were filed and within the required time frame?* (UNGS.RPT.INCIDENTREPORTSUPP.R) 191.15(d) (191.15(c))

8. Safety-Related Conditions Reporting (SRCR) *Are procedures in place to report a safety-related condition as required by 191.23?* (UNGS.RPT.SRCR.P) 191.23(a) (191.23(b);191.25(a);191.25(b);191.25(c))

9. Safety-Related Conditions Reporting (SRCR) *Have any Safety-Related Condition Reports been submitted to PHMSA/OPS?* (UNGS.RPT.SRCR.R) 191.23(a) (191.23(b);191.25(a);191.25(b);191.25(c))

10. Safety-Related Conditions Reporting (SRCR) - Bridge Plugs *Have any wells been isolated using a bridge plug?* (UNGS.RPT.SRCRBRIDGEPLUG.R) 191.23(a) (191.23(b);191.25(a))

11. Annual Report *Does the process require submittal of an annual report (Form 7100.4-1) by March 15 for the preceding calendar year?* (UNGS.RPT.ANNUALREPORT.P) 191.17(c)

12. Annual Report *Are annual reports retained?* (UNGS.RPT.ANNUALREPORT.R) 191.17(c)

13. Withdrawal Only Well Reporting *If applicable, are storage facility wells that are withdrawal only (i.e., shallow capture wells or recirculation wells) included in the Annual Report and also included in the Risk Management and Integrity Management programs?* (UNGS.RPT.WDONLYWELLS.R) 192.12(d) (API RP1171, Section 8.2;API RP1171, Section 9.3;API RP1170, Section 10.3)

14. National Registry - OPID *Does the process require the obtaining, and appropriate control, of Operator Identification Numbers (OPIDs) for the storage field?* (UNGS.RPT.OPID.P) 191.22(a) (191.22(b))

15. National Registry - Notification of Changes *What is the process in place to notify PHMSA of any changes that fall under 191.22(c) (i.e., construction, conversions, change in entity, or acquisition or divestiture)?* (UNGS.RPT.REGISTRYCHGSNOTIF.P) 191.22(c)

16. National Registry - Notification of Changes *Are records retained for changes, per 191.22(c), that occur to the storage facility?* (UNGS.RPT.REGISTRYCHGSNOTIF.R) 191.22(c)

Underground Natural Gas Storage - Reservoirs - Integrity in Reservoir Design

1. Geological Characterization - Evaluation *Is there a process for preliminary evaluation, characterization, and mapping of the geologic properties of the reservoir that is intended for storing gas?* (UNGS.RESDES.GEOLOGICEVAL.P) 192.12(c) (API RP1171, Section 5.2.2)

2. Geological Characterization - Evaluation *Do records demonstrate that the intended reservoir was evaluated, characterized and mapped for properties intended for gas storage?* (UNGS.RESDES.GEOLOGICEVAL.R) 192.12(c) (API RP1171, Section 5.2.2)

3. Geological Characterization - Buffer Zone *Does the process use the geologic characterization to establish the initial vertical and areal buffer zone to protect the integrity of the natural gas storage operation?* (UNGS.RESDES.GEOLOGICBUFFER.P) 192.12(c) (API RP1171, Section 5.2.2)

4. Geological Characterization - Buffer Zone *Do records demonstrate that the initial vertical and areal buffer zones were established based on the geological characterization?* (UNGS.RESDES.GEOLOGICBUFFER.R) 192.12(c) (API RP1171, Section 5.2.2)

5. Engineering Characterization - Design for Integrity *Does the process require, at a minimum, evaluation of the casing materials, casing configuration, casing set depths, cement materials, and placement depths for mechanical integrity of all existing and abandoned wells that penetrate the formations being characterized for storage purposes?* (UNGS.RESDES.ENGRCHCTR1.P) 192.12(c) (API RP1171, Section 5.3.2)

6. Engineering Characterization - Design for Integrity *Do records demonstrate that all existing and abandoned wells, that penetrate the characterized formation for storage, have been evaluated for casing materials, casing configuration, casing set depths, cement materials, and placement depths for functional integrity?* (UNGS.RESDES.ENGRCHCTR1.R) 192.12(c) (API RP1171, Section 5.3.2)

7. Engineering Characterization - Corrosive Potential *Does the process account for the corrosive potential of the pore fluids if the storage reservoir was used for gas-liquid or oil production?* (UNGS.RESDES.ENGRCHCTR2.P) 192.12(c) (API RP1171, Section 5.3.2)

8. Engineering Characterization - Corrosive Potential *Do records demonstrate that pore fluids have been evaluated for corrosive potential?* (UNGS.RESDES.ENGRCHCTR2.R) 192.12(c) (API RP1171, Section 5.3.2)

9. Engineering Characterization - Corrosion Management *Does the process incorporate the corrosive potential of pore fluids, if present, into the design and operation strategies of the storage reservoir ?* (UNGS.RESDES.ENGRCHCTR3.P) 192.12(c) (API RP1171, Section 5.3.2)

10. Engineering Characterization - Corrosion Management *If there is a corrosive potential from pore fluids, do records demonstrate that the design and operation accounts for the corrosive potential?* (UNGS.RESDES.ENGRCHCTR3.R) 192.12(c) (API RP1171, Section 5.3.2)

11. Engineering Characterization - Fluids Issues *Does the process require identification and mitigation of potential mineralogical and fluid compatibility issues?* (UNGS.RESDES.ENGRCHCTR4.P) 192.12(c) (API RP1171, Section 5.3.2)

12. Engineering Characterization - Fluids Issues *Do records demonstrate that mineralogical and fluid compatibility issues are identified and mitigated?* (UNGS.RESDES.ENGRCHCTR4.R) 192.12(c) (API RP1171, Section 5.3.2)

13. Engineering Characterization - Reservoir Pressures *Does the characterization process require the identification of initial and current reservoir pressures based on known data ? (UNGS.RESDES.ENGRCHCTR5.P) 192.12(c) (API RP1171, Section 5.3.2)*

14. Engineering Characterization - Reservoir Pressures *Do records demonstrate that the initial and current pressures, for the target reservoir, are identified based on known data? (UNGS.RESDES.ENGRCHCTR5.R) 192.12(c) (API RP1171, Section 5.3.2)*

15. Engineering Characterization - All *Are field observations consistent with the engineering characterization of the reservoir? (UNGS.RESDES.ENGRCHCTRALL.O) 192.12(C) (API RP1171, Section 5.3.2)*

16. Reservoir Containment Assurance Analysis *Does the process require that data be acquired to manage uncertainties that were identified during the geologic and engineering characterization process? (UNGS.RESDES.CONTASSURANCE.P) 192.12(c) (API RP1171, Section 5.4.1)*

17. Reservoir Containment Assurance Analysis *Do records indicate that data was acquired to manage uncertainties identified during the characterization process? (UNGS.RESDES.CONTASSURANCE.R) 192.12(c) (API RP1171, Section 5.4.1)*

18. Containment Capability of Reservoir *Does the process assess the containment capability of the reservoir and the wells for the designed storage operation volumes, pressures, and rates? (UNGS.RESDES.CONTCAPABILITY.P) 192.12(c) (API RP1171, Section 5.4.1)*

19. Containment Capability of Reservoir *Do records demonstrate that the containment capability of the reservoir and wells was assessed for the designed storage operation volumes, pressures, and rates? (UNGS.RESDES.CONTCAPABILITY.R) 192.12(c) (API RP1171, Section 5.4.1)*

20. Containment Assurance - Reservoir Connectivity *Does the process address gas migration control and containment when porous zones are connected with the target reservoir? (UNGS.RESDES.GASMIGRATION.P) 192.12(c) (API RP1171, Section 5.4.2)*

21. Containment Assurance - Reservoir Connectivity *Do records demonstrate that gas migration control and containment were addressed in the design, if the target reservoir is connected to another porous zone?* (UNGS.RESDES.GASMIGRATION.R) 192.12(c) (API RP1171, Section 5.4.2)

22. Maximum Reservoir Pressure *Does the process provide a design basis for the maximum pressure of the storage reservoir?* (UNGS.RESDES.MAXRESPRESS.P) 192.12(c) (API RP1171, Section 5.4.3)

23. Maximum Reservoir Pressure *Do records demonstrate that the design basis for the maximum reservoir pressure was documented?* (UNGS.RESDES.MAXRESPRESS.R) 192.12(c) (API RP1171, Section 5.4.3)

24. Maximum Pressures - Wells, Piping, and Other *Does the process provide a design basis for the maximum pressure of the wells, wellheads, piping, or associated storage facilities?* (UNGS.RESDES.MAXPRESSOTHER.P) 192.12(c) (API RP1171, Section 5.4.3)

25. Maximum Pressures - Wells, Piping, and Other *Do records demonstrate that the pressure limits of the wells, wellheads, piping, and associated storage facilities are not exceeded?* (UNGS.RESDES.MAXPRESSOTHER.R) 192.12(c) (API RP1171, Section 5.4.3)

26. Maximum Pressures - Reservoir, Wells, Piping, and Other *Do pressure reading observations reflect that actual pressures are within the established set limits?* (UNGS.RESDES.MAXPRESSALL.O) 192.12(c) (API RP1171, Section 5.4.3)

27. Well Containment Assurance Analysis *Does the process require evaluation of all wells that penetrate the storage zone for containment assurance?* (UNGS.RESDES.WELLCONTASSURANCE.P) 192.12(c) (API RP1171, Section 5.4.4)

28. Well Containment Assurance Analysis *Do records demonstrate that all wells that penetrate the storage zone have been evaluated for containment assurance?* (UNGS.RESDES.WELLCONTASSURANCE.R) 192.12(c) (API RP1171, Section 5.4.4)

29. Supplemental Evaluation of Reservoirs Developed within Aquifers *For storage reservoirs developed within aquifers, does the process require supplemental reservoir geological and engineering evaluation for the delineation of the storage reservoir?* (UNGS.RESDES.AQUIFEREVAL01.P) 192.12(c) (API RP1171, Section 5.4.5)

30. Supplemental Evaluation of Reservoirs Developed within Aquifers *Do records demonstrate that supplemental aquifer reservoir geological and engineering evaluations were performed?* (UNGS.RESDES.AQUIFEREVAL01.R) 192.12(c) (API RP1171, Section 5.4.5)

31. Supplemental Evaluation of Reservoirs Developed within Aquifers *For storage reservoirs developed within aquifers, does the process require data gathering and characterization of the reservoir, caprock, basal rock, and lateral seals through drilling, logging and coring?* (UNGS.RESDES.AQUIFEREVAL02.P) 192.12(c) (API RP1171, Section 5.4.5)

32. Supplemental Evaluation of Reservoirs Developed within Aquifers *Do records demonstrate that aquifer containment assurance data was acquired through drilling, logging, and coring of the aquifer?* (UNGS.RESDES.AQUIFEREVAL02.R) 192.12(c) (API RP1171, Section 5.4.5)

33. Supplemental Evaluation of Reservoirs Developed within Aquifers *For storage reservoirs developed within aquifers, does the process require that site specific geophysical delineation be performed?* (UNGS.RESDES.AQUIFEREVAL03.P) 192.12(c) (API RP1171, Section 5.4.5)

34. Supplemental Evaluation of Reservoirs Developed within Aquifers *Do records demonstrate that site specific geophysical delineation was conducted for the aquifer storage?* (UNGS.RESDES.AQUIFEREVAL03.R) 192.12(c) (API RP1171, Section 5.4.5)

35. Supplemental Evaluation of Reservoirs Developed within Aquifers *For storage reservoirs developed within aquifers, is there a process requiring that water pump testing and water level observation be performed to characterize the storage reservoir dimensions, gas capacity, flow performance, and caprock integrity?* (UNGS.RESDES.AQUIFEREVAL04.P) 192.12(c) (API RP1171, Section 5.4.5)

36. Supplemental Evaluation of Reservoirs Developed within Aquifers *Do records demonstrate that a water pump test and water level observation were performed to characterize the storage reservoir within an aquifer?* (UNGS.RESDES.AQUIFEREVAL04.R) 192.12(c) (API RP1171, Section 5.4.5)

37. Storage Design Recordkeeping *Does the process require design records to be maintained for the following activities: geologic records; engineering records; land and mineral ownership, rights, and control; facility integrity plan; well drilling, completion, workover and plugging records; regulatory records and permits?* (UNGS.RESDES.DESRECORDS.P) 192.12(c) (API RP1171, Section 5.6)

38. Storage Design Recordkeeping *Do records demonstrate that the required design records have been maintained?* (UNGS.RESDES.DESRECORDS.R) 192.12(c) (API RP1171, Section 5.6)

39. Storage Design Recordkeeping - Life of Facility *Does the process require that accurate and comprehensive records of natural gas storage design activities be maintained for the life of the facility?* (UNGS.RESDES.DESRECORDSLOF.P) 192.12(c) (API RP1171, Section 5.6)

40. Storage Design Recordkeeping - Life of Facility *Are design records accurate and comprehensive and maintained for the lifetime of the facility?* (UNGS.RESDES.DESRECORDSLOF.R) 192.12(c) (API RP1171, Section 5.6)

Underground Natural Gas Storage - Reservoirs - Integrity in Well Design & Construction

1. Design of Wellhead Equipment *Does the process ensure that new and replaced wellheads allow for full diameter entry to the wellbore?* (UNGS.RESWELLDES.WELLHEADEQUIP.P) 192.12(c) (API RP1171, Section 6.2.2)

2. Design of Wellhead Equipment *Do records demonstrate that new and replaced wellheads allow for full diameter entry to the wellbore?* (UNGS.RESWELLDES.WELLHEADEQUIP.R) 192.12(c) (API RP1171, Section 6.2.2)

3. Design of Wellhead Equipment - Restricted Diameter *Does the process require review of well records to determine if limited wellhead entry is sufficient for planned activities?* (UNGS.RESWELLDES.WELLHEADENTRY.P) 192.12(c) (API RP1171, Section 6.2.2)

4. Design of Wellhead Equipment - Isolation Valve *Does the process require that wells be equipped with valves that provide isolation of the well from the pipeline system and for entry into the wellbore?* (UNGS.RESWELLDES.WELLHEADISOLVLV.P) 192.12(c) (API RP1171, Section 6.2.2)

5. Design of Wellhead Equipment - Isolation Valve *Do records demonstrate that wells are equipped with valves that provide isolation from the pipeline and entry into the wellbore?* (UNGS.RESWELLDES.WELLHEADISOLVLV.R) 192.12(c) (API RP1171, Section 6.2.2)

6. Design of Wellhead Equipment - Pressure Rating *Does the process ensure that wellhead equipment is pressure rated to exceed the maximum anticipated operating pressure?* (UNGS.RESWELLDES.WELLHEADRATING.P) 192.12(c) (API RP1171, Section 6.2.3)

7. Design of Wellhead Equipment - Pressure Rating *Do records demonstrate that wellhead equipment is pressure rated to exceed the maximum anticipated operating pressure?* (UNGS.RESWELLDES.WELLHEADRATING.R) 192.12(c) (API RP1171, Section 6.2.3)

8. Design of Wellhead Equipment - Pressure Rating *Do pressure ratings of wellhead equipment reflect the documented ratings?* (UNGS.RESWELLDES.WELLHEADRATING.O) 192.12(c) (API RP1171, Section 5.5.1)

9. Design of Wellhead Equipment - ESD Valve Review *Does the process require evaluation of the need of an emergency shut down (ESD) valve by reviewing the requirements of API RP 1171 section 6.2.5?* (UNGS.RESWELLDES.WELLHEADESD.P) 192.12(c) (API RP1171, Section 6.2.5)

10. Design of Wellhead Equipment - ESD Valve Review *Do records demonstrate that the need for emergency shutdown valves were reviewed based on the requirements of API RP 1171 Section 6.2.5?* (UNGS.RESWELLDES.WELLHEADESD.R) 192.12(c) (API RP1171, Section 6.2.5)

11. Well Casing - Completion *Does the process require that well designs are completed with two or more strings of casing to protect ground water, control wellbore conditions, isolate the storage gas, and inject storage gas from the pipeline into and withdraw out of the storage reservoir?* (UNGS.RESWELLDES.WELLCOMPLETION.P) 192.12(c) (API RP1171, Section 6.3.1)

12. Well Casing - Completion *Do well records indicate that storage wells are completed with two or more strings of casing to protect ground water, control wellbore conditions, isolate the storage gas, and inject storage gas from the pipeline into and withdraw out of the storage reservoir?* (UNGS.RESWELLDES.WELLCOMPLETION.R) 192.12(c) (API RP1171, Section 6.3.1)

13. Well Casing - Design per API 5C3 *Does the process require the use API 5C3 for casing designs?* (UNGS.RESWELLDES.WELLCASINGDES.P) 192.12(c) (API RP1171, Section 6.3.1)

14. Well Casing - Design per API 5C3 *Do well records indicate that API 5C3 was used for the design of the casings?* (UNGS.RESWELLDES.WELLCASINGDES.R) 192.12(c) (API RP1171, Section 6.3.1)

15. Surface Casing Design *Does the design process require that the surface casing be of sufficient size, grade, and depth to support drilling operations and to protect groundwater?* (UNGS.RESWELLDES.SURFCASINGDES.P) 192.12(c) (API RP1171, Section 6.3.3)

16. Surface Casing Design *Do records indicate that the surface casing is of sufficient size, grade, and depth to support drilling operations and to protect groundwater?* (UNGS.RESWELLDES.SURFCASINGDES.R) 192.12(c) (API RP1171, Section 6.3.3)

17. Production Casing Design *Does the design process require that the production casing be of adequate size and strength to maintain the well integrity?* (UNGS.RESWELLDES.PRODCASINGDES1.P) 192.12(c) (API RP1171, Section 6.3.5)

18. Production Casing Design *Do records indicate that the production casing is of sufficient size, strength, and depth to maintain the well integrity and be compatible with fluid chemical composition?* (UNGS.RESWELLDES.PRODCASINGDES1.R) 192.12(c) (API RP1171, Section 6.3.5)

19. Production Casing Design - Fluids Compatibility *Does the design process require that the production casing be compatible with fluid chemical composition?* (UNGS.RESWELLDES.PRODCASINGDES2.P) 192.12(c) (API RP1171, Section 6.3.5)

20. Production Casing Design - Fluids Compatibility *Do records indicate that the production casing is compatible with fluid chemical composition?* (UNGS.RESWELLDES.PRODCASINGDES2.R) 192.12(c) (API RP1171, Section 6.3.5)

21. Production Casing Design - Perforations *Does the process require that the production casing be free of open perforations or holes other than the planned completion interval(s)?* (UNGS.RESWELLDES.PRODCASINGDES3.P) 192.12(c) (API RP1171, Section 6.3.5)

22. Production Casing Design - Perforations *Do records indicate that the production casing is free of open perforations or holes other than the planned completion interval(s)?* (UNGS.RESWELLDES.PRODCASINGDES3.R) 192.12(c) (API RP1171, Section 6.3.5)

23. Production Casing Design - Perforations Sealed *Does the process require that perforations created in production casing for investigative or remedial work be sealed to establish hydraulic isolation?* (UNGS.RESWELLDES.PRODCASINGDES4.P) 192.12(c) (API RP1171, Section 6.3.5)

24. Production Casing Design - Perforations Sealed *Do records indicate that perforations created in production casing for investigative or remedial work were sealed to establish hydraulic isolation?* (UNGS.RESWELLDES.PRODCASINGDES4.R) 192.12(c) (API RP1171, Section 6.3.5)

25. Casing Handling and Transport *Does the process ensure that the casing is stored, transported, lifted, and installed according to manufacturer specifications and API 5C1?* (UNGS.RESWELLDES.CASINGHANDLING.P) 192.12(c) (API RP1171, Section 6.3.6)

26. Casing Handling and Transport *Do records demonstrate that the casing was stored, transported, lifted and installed as specified by the manufacturer and API 5C1?* (UNGS.RESWELLDES.CASINGHANDLING.R) 192.12(c) (API RP1171, Section 6.3.6)

27. Casing Connections - Design *Does the process require that casing connections be designed to accommodate loads associated with placement?* (UNGS.RESWELLDES.CASINGCONN1.P) 192.12(c) (API RP1171, Section 6.3.7)

28. Casing Connections - Design *Do records demonstrate that the casing connections can withstand loads associated with placement of the casing?* (UNGS.RESWELLDES.CASINGCONN1.R) 192.12(c) (API RP1171, Section 6.3.7)

29. Casing Connections - Gas Seal *Does the process ensure that the casing connections can maintain a gas seal under anticipated wellbore flow conditions and subsequent work?* (UNGS.RESWELLDES.CASINGCONN2.P) 192.12(c) (API RP1171, Section 6.3.7)

30. Casing Connections - Gas Seal *Do records indicate that casing connections have the ability to maintain a gas seal under well flow conditions and subsequent work?* (UNGS.RESWELLDES.CASINGCONN2.R) 192.12(c) (API RP1171, Section 6.3.7)

31. Casing Connections - Specifications *Does the process ensure that casing connections are made up according to manufacturer specifications or in accordance with API 5CT?* (UNGS.RESWELLDES.CASINGCONN3.P) 192.12(c) (API RP1171, Section 6.3.7)

32. Casing Connections - Specifications *Do records demonstrate that the casing connections are made up according to manufacturer specifications or in accordance with API 5CT?* (UNGS.RESWELLDES.CASINGCONN3.R) 192.12(c) (API RP1171, Section 6.3.7)

33. Casing Connections - Thread Compound *Does the process ensure that casing thread compound or lubricant is compatible with the expected wellbore environment?* (UNGS.RESWELLDES.CASINGCONN4.P) 192.12(c) (API RP1171, Section 6.3.7)

34. Casing Connections - Thread Compound *Do records demonstrate that the casing thread compound or lubricant is compatible with the expected wellbore environment?* (UNGS.RESWELLDES.CASINGCONN4.R) 192.12(c) (API RP1171, Section 6.3.7)

35. Casing Connections - Lubricant Specs *Does the process ensure that casing thread compound or lubricant is consistent with the manufacturer's recommended lubricant or API 5A3?* (UNGS.RESWELLDES.CASINGCONN5.P) 192.12(c) (API RP1171, Section 6.3.7)

36. Casing Connections - Lubricant Specs *Do records demonstrate that the casing thread compound or lubricant is consistent with the manufacturer's recommended lubricant or API 5A3?* (UNGS.RESWELLDES.CASINGCONN5.R) 192.12(c) (API RP1171, Section 6.3.7)

37. Casing Cement *Does the process ensure that the cement slurry or slurry combination is designed for hydrostatic weight control and strength requirements for the storage reservoir?* (UNGS.RESWELLDES.CASINGCEMENT.P) 192.12(c) (API RP1171, Section 6.4.3)

38. Casing Cement *Do records demonstrate that the cement slurry or slurry combination used for the storage reservoir are/were designed for hydrostatic weight control and strength requirements?* (UNGS.RESWELLDES.CASINGCEMENT.R) 192.12(c) (API RP1171, Section 6.4.3)

39. Cement Slurry Design *Does the process ensure that the fracture gradient of the storage zone is not exceeded during cement pumping operations?* (UNGS.RESWELLDES.CEMENTSLURRY.P) 192.12(c) (API RP1171, Section 6.4.4)

40. Cement Slurry Design *Do records demonstrate that the storage zone fracture gradient was not exceeded during cement pumping operations?* (UNGS.RESWELLDES.CEMENTSLURRY.R) 192.12(c) (API RP1171, Section 6.4.4)

41. Cement Pumping Design *Does the process require that competent uncontaminated cement be placed around the casing shoe and around the circumference of the casing?* (UNGS.RESWELLDES.CEMENTPUMPING.P) 192.12(c) (API RP1171, Section 6.4.5)

42. Cement Pumping Design *Do records indicate that competent, uncontaminated cement is placed at casing shoes and around the circumference of the casing?* (UNGS.RESWELLDES.CEMENTPUMPING.R) 192.12(c) (API RP1171, Section 6.4.5)

43. Cement Bond Evaluation *Is there a process for evaluating the cement placement and bond quality through cement bond log or other means that can demonstrate the sealing potential of the cement?* (UNGS.RESWELLDES.CEMENTBOND.P) 192.12(c) (API RP1171, Section 6.4.6)

44. Cement Bond Evaluation *Do records demonstrate that the bond or seal quality and cement placement were evaluated by cement bond log or other means and demonstrated the bond or seal quality and placement of the cement?* (UNGS.RESWELLDES.CEMENTBOND.R) 192.12(c) (API RP1171, Section 6.4.6)

45. Well Completion and Stimulation *Does the process require that well completion and stimulation operations are done to verify that pressure, flow rates, and other mechanical conditions have no adverse impact on the storage reservoir, caprock, or the mechanical integrity of the well?* (UNGS.RESWELLDES.COMPLETION.P) 192.12(c) (API RP1171, Section 6.5.1)

46. Well Completion and Stimulation *Do records demonstrate that the pressure, flow rates, and other mechanical conditions have been verified to indicate that there is no adverse impact on the storage reservoir, caprock, or the mechanical integrity of the well?* (UNGS.RESWELLDES.COMPLETION.R) 192.12(c) (API RP1171, Section 6.5.1)

47. Fracture Stimulation *Does the process for fracture treatment, if used, ensure that the fracture height or length does not compromise the integrity of the storage reservoir?* (UNGS.RESWELLDES.STIMULATION.P) 192.12(c) (API RP1171, Section 6.5.3)

48. Fracture Stimulation *Do records demonstrate that the integrity of the storage reservoir has not been compromised by fracture treatment?* (UNGS.RESWELLDES.STIMULATION.R) 192.12(c) (API RP1171, Section 6.5.3)

49. Well Remediation *For wells identified as having compromised mechanical integrity, does the process require evaluation and responsive action within a timeframe corresponding to the severity of the integrity risk?* (UNGS.RESWELLDES.REMEDIATION.P) 192.12(c) (API RP1171, Section 6.6.1)

50. Well Remediation *For wells identified as having compromised mechanical integrity, do records demonstrate that they were evaluated and remediated within a time frame corresponding to the severity of the integrity risk?* (UNGS.RESWELLDES.REMEDIATION.R) 192.12(c) (API RP1171, Section 6.6.1)

51. Well Closure (Plugging and Abandonment) *Does the process for abandonment of a well require a design for long-term isolation of the storage zone and any other penetrated zones from the surface?* (UNGS.RESWELLDES.CLOSURE.P) 192.12(c) (API RP1171, Section 6.7.1)

52. Well Closure (Plugging and Abandonment) *Do the records demonstrate that well abandonment for long term isolation of the storage zone and any other penetrated zone from the surface was achieved?* (UNGS.RESWELLDES.CLOSURE.R) 192.12(c) (API RP1171, Section 6.7.1)

53. Well Closure (Plugging and Abandonment) Records *Does the process define a retention period for abandonment records?* (UNGS.RESWELLDES.CLOSUREREC.P) 192.12(c) (API RP1171, Section 6.7.1)

54. Well Closure (Plugging and Abandonment) Records *Do records demonstrate that the retention period for abandonment records was followed?* (UNGS.RESWELLDES.CLOSUREREC.R) 192.12(c) (API RP1171, Section 6.7.1)

55. Well Closure (Plugging and Abandonment) Observations *Do field observations indicate that the operator followed the outlined abandonment process?* (UNGS.RESWELLDES.CLOSUREALL.O) 192.12(c) (API RP1171, Section 6.7.1)

56. Storage Zone Isolation - Plugs *Does the abandonment process require use of cement plugs and/or mechanical plugs to isolate the storage zone from fluid migration?* (UNGS.RESWELLDES.PLUGS.P) 192.12(c) (API RP1171, Section 6.7.2)

57. Storage Zone Isolation - Plugs *Do records demonstrate which type of abandonment plug was used as defined by API 1171, Section 6.7.2?* (UNGS.RESWELLDES.PLUGS.R) 192.12(c) (API RP1171, Section 6.7.2)

58. Storage Zone Isolation - Determination *Does the process ensure that the location of groundwater and hydrocarbon bearing zones were determined to prevent communication between any of those zones during and after plugging of the wells?* (UNGS.RESWELLDES.ISOLATION.P) 192.12(c) (API RP1171, Section 6.7.2)

59. Storage Zone Isolation - Determination *Do records indicate the depths of the groundwater and hydrocarbon zones penetrated by the well to be abandoned?* (UNGS.RESWELLDES.ISOLATION.R) 192.12(c) (API RP1171, Section 6.7.2)

60. Storage Zone Isolation - Cement Evaluation *Does the process require that the casing and cement across the water and hydrocarbon zones be properly evaluated before abandoning of the well?* (UNGS.RESWELLDES.CEMENTEVAL.P) 192.12(c) (API RP1171, Section 6.7.2)

61. Storage Zone Isolation - Cement Evaluation *Do records demonstrate that casing and cement evaluations were conducted through zones of importance prior to abandoning?* (UNGS.RESWELLDES.CEMENTEVAL.R) 192.12(c) (API RP1171, Section 6.7.2)

62. Storage Zone Isolation - Cement Plug Depth *Does the process require verification that the abandonment plug is set at the proper depth and has reached sufficient compressive strength?* (UNGS.RESWELLDES.CEMENTPLUGDEPTH.P) 192.12(c) (API RP1171, Section 6.7.2)

63. Storage Zone Isolation - Cement Plug Depth *Do the records indicate that abandonment plug depths were achieved and verified?* (UNGS.RESWELLDES.CEMENTPLUGDEPTH.R) 192.12(c) (API RP1171, Section 6.7.2)

64. Storage Zone Isolation - Cement Plug Properties *Do the records indicate that abandonment plug properties and pressure records of plug testing are maintained?* (UNGS.RESWELLDES.CEMENTPLUGPROP.R) 192.12(c) (API RP1171, Section 6.7.2)

65. Storage Zone Isolation - Plug Deviations *Does the process require that any deviations that threatened the isolation objectives of the abandonment plug are to be corrected?* (UNGS.RESWELLDES.DEVIATIONS.P) 192.12(c) (API RP1171, Section 6.7.2)

66. Storage Zone Isolation - Plug Deviations *Do the records indicate that deviations that threatened the isolation objectives of the abandonment plug were corrected?* (UNGS.RESWELLDES.DEVIATIONS.R) 192.12(c) (API RP1171, Section 6.7.2)

67. Abandoned Well Maintenance - Failed Plug Repair *Does the process include the repair of failed plugs in an abandoned well?* (UNGS.RESWELLDES.PLUGREPAIR.P) 192.12(c) (API RP1171, Section 6.7.3)

68. Abandoned Well Maintenance - Failed Plug Repair *Do records demonstrate that failed abandonment plugs were repaired according to procedure?* (UNGS.RESWELLDES.PLUGREPAIR.R) 192.12(c) (API RP1171, Section 6.7.3)

69. Abandoned Well Maintenance - Well Leak Repair *Does the abandonment process include the repair of a well having any leak indication that may suggest a lack of isolation of the storage reservoir?* (UNGS.RESWELLDES.WELLREPAIR.P) 192.12(c) (API RP1171, Section 6.7.3)

70. Abandoned Well Maintenance - Well Leak Repair *Do records demonstrate that abandoned wells having an indication of leaks were repaired according to procedure?* (UNGS.RESWELLDES.WELLREPAIR.R) 192.12(c) (API RP1171, Section 6.7.3)

71. Abandoned Well Maintenance - Surface Plug *Does the abandonment process require the installation of a surface plug and cap?* (UNGS.RESWELLDES.SURFACEPLUG.P) 192.12(c) (API RP1171, Section 6.7.3)

72. Abandoned Well Maintenance - Surface Plug *Do records indicate that surface plugs and caps were installed in abandoned wells?* (UNGS.RESWELLDES.SURFACEPLUG.R) 192.12(c) (API RP1171, Section 6.7.3)

73. Abandoned Well Maintenance - Cap Identification *Does the process require the abandoned well surface cap to include the API number or another form of identification?* (UNGS.RESWELLDES.CAPIDENTIF.P) 192.12(c) (API RP1171, Section 6.7.3)

74. Abandoned Well Maintenance - Cap Identification *Do field observations indicate evidence of an abandoned well surface cap, along with its identification, installed on each abandoned well?* (UNGS.RESWELLDES.CAPIDENTIF.O) 192.12(c) (API RP1171, Section 6.7.3)

75. EHS - People & Environmental Safeguards *Does the design and construction process incorporate safeguards to protect the environment and the safety and health of workers and the public into well design and during well work activities?* (UNGS.RESWELLDES.EHSPEOPLEENV.P) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

76. EHS - People & Environmental Safeguards *Do records indicate that safeguards to the environment, safety, and health of workers and the public were used in well design and construction, and during well work activities?* (UNGS.RESWELLDES.EHSPEOPLEENV.R) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

77. EHS - Water & Groundwater Safeguards *Does the design and construction process include protections for surface water and ground water from drilling and well work operations?* (UNGS.RESWELLDES.EHSWATER.P) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

78. EHS - Water & Groundwater Safeguards *Do records demonstrate that the surface water and ground water safeguards were used in well design and during drilling and well work operations?* (UNGS.RESWELLDES.EHSWATER.R) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

79. EHS - Monitoring Worksite Conditions *Does the construction process ensure that the worksite is monitored during well drilling, construction, and well work activities to protect the environment and the safety and health of workers and the public?* (UNGS.RESWELLDES.EHSWORKSITE.P) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

80. EHS - Monitoring Worksite Conditions *Do records demonstrate that the well site was monitored during drilling, construction and well work activities to protect the environment and the safety and health of workers and the public?* (UNGS.RESWELLDES.EHSWORKSITE.R) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

81. EHS - Monitoring Worksite Conditions *Do field observations indicate that safeguards and monitoring methods specific to the safety and health of workers, the public, and the environment are in place as per procedure?* (UNGS.RESWELLDES.EHSWORKSITE.O) 192.12(c) (API RP1171, Section 6.8.1;API RP1171, Section 5.5.1)

82. Well Testing and Commissioning *Does the process require that production casing be tested to demonstrate mechanical integrity and suitability for the designed operating conditions prior to commissioning per API RP 1171, Section 6.9.1?* (UNGS.RESWELLDES.WELLTESTING.P) 192.12(c) (API RP1171, Section 6.9.1)

83. Well Testing and Commissioning *Do records demonstrate that the production casing was tested to demonstrate mechanical integrity and suitability for designed operating conditions prior to commissioning per API RP 1171 Section 6.9.1?* (UNGS.RESWELLDES.WELLTESTING.R) 192.12(c) (API RP1171, Section 6.9.1)

84. Well Testing Design *Does the process require test design such that the maximum pressure on the packer seat and the pressure at any point in the wellbore during the test does not compromise the mechanical integrity of the well?* (UNGS.RESWELLDES.WELLTESTDES.P) 192.12(c) (API RP1171, Section 6.9.1)

85. Well Testing Design *Do records demonstrate that the test was designed so the maximum pressure does not compromise the mechanical integrity of the wells?* (UNGS.RESWELLDES.WELLTESTDES.R) 192.12(c) (API RP1171, Section 6.9.1)

86. Monitoring of Construction Activities *Does the process require documentation and retention of records of deviations where such deviations from the original design or in the procedures are required to resolve encountered issues or problems during well activities?* (UNGS.RESWELLDES.CONSTRMONITOR.P) 192.12(c) (API RP1171, Section 6.10.4)

87. Monitoring of Construction Activities *Do records demonstrate that deviations from the original well design were documented?* (UNGS.RESWELLDES.CONSTRMONITOR.R) 192.12(c) (API RP1171, Section 6.10.4)

88. Monitoring Construction Activities - Maintaining Integrity *Does the process require that well issues or problems are resolved in a manner that maintains the functional integrity of the well and reservoir prior to commissioning?* (UNGS.RESWELLDES.MAINTINTEGRITY.P) 192.12(c) (API RP1171, Section 6.10.4)

89. Monitoring Construction Activities - Maintaining Integrity *Do records demonstrate that functional integrity was maintained during the resolution of issues or problems prior to commissioning?* (UNGS.RESWELLDES.MAINTINTEGRITY.R) 192.12(c) (API RP1171, Section 6.10.4)

90. Well Work Records *Do records include, as applicable and available, the items listed in API RP 1171, Section 6.11.1, to be maintained?* (UNGS.RESWELLDES.WELLRECORDS.R) 192.12(c) (API RP1171, Section 6.11.1)

91. Well Work Records Retention *Are records for well completion, well construction and well work activities maintained for the life of the facility?* (UNGS.RESWELLDES.WELLRECORDSRET.R) 192.12(c) (API RP1171, Section 6.11.1)

92. Permitting, Procedures, Personnel, and Equipment Records *Do records include, as applicable and available, the items listed in API RP 1171, Section 6.11.2?* (UNGS.RESWELLDES.GENRECORDS.R) 192.12(c) (API RP1171, Section 6.11.2)

93. Permitting, Procedures, Personnel, and Equipment Records Retention *Does the process define a retention period for records relating to permitting, procedures, personnel, and equipment?* (UNGS.RESWELLDES.GENRECORDSRET.P) 192.12(c) (API RP1171, Section 6.11.2)

Underground Natural Gas Storage - Reservoirs - Integrity Through Initial Pressure & Inventory

1. Reservoir Integrity Monitoring - Material Balance *Does the process require monitoring of the material balance behavior relative to the original design and expected reservoir behavior?* (UNGS.RESINITIAL.MATBALANCE1.P) 192.12(c) (API RP1171, Section 7.3.1)

2. Reservoir Integrity Monitoring - Material Balance *Do records demonstrate that the monitored material balance behavior of the storage reservoir is consistent with the expected reservoir behavior?* (UNGS.RESINITIAL.MATBALANCE1.R) 192.12(c) (API RP1171, Section 7.3.1)

3. Reservoir Integrity Monitoring - Unexpected Conditions *Does the process require evaluation and correcting of any unexpected condition detected during material balance monitoring?* (UNGS.RESINITIAL.MATBALANCE2.P) 192.12(c) (API RP1171, Section 7.3.1)

4. Reservoir Integrity Monitoring - Unexpected Conditions *Do records demonstrate that unexpected conditions in the material balance were evaluated and corrected?* (UNGS.RESINITIAL.MATBALANCE2.R) 192.12(c) (API RP1171, Section 7.3.1)

5. Monitoring and Analysis Methods - Reservoir Pressure *Does the process require that the average reservoir pressure versus inventory graph be monitored to capture any unexpected conditions?* (UNGS.RESINITIAL.PRESSVSINVENT.P) 192.12(c) (API RP1171, Section 7.3.2)

6. Monitoring and Analysis Methods - Reservoir Pressure *Do records demonstrate that the average reservoir pressure versus inventory graph was monitored to capture unexpected conditions?* (UNGS.RESINITIAL.PRESSVSINVENT.R) 192.12(c) (API RP1171, Section 7.3.2)

7. Mechanical Integrity Monitoring - Abnormal Operating Conditions *Does the process require that wells and related facilities be monitored for mechanical integrity to discover and correct for abnormal operating conditions?* (UNGS.RESINITIAL.MECHINTEGMONIT.P) 192.12(c) (API RP1171, Section 7.4.1)

8. Mechanical Integrity Monitoring - Abnormal Operating Conditions *Do records demonstrate that the mechanical integrity of wells and related facilities are monitored to discover and correct for abnormal operating conditions?* (UNGS.RESINITIAL.MECHINTEGMONIT.R) 192.12(c) (API RP1171, Section 7.4.1)

9. Recordkeeping of Testing and Monitoring Activities *Do records include the required items, as applicable and available, listed in API RP 1171, Section 7.5?* (UNGS.RESINITIAL.RECORDS.R) 192.12(c) (API RP1171, Section 7.5)

10. Recordkeeping Retention of Testing and Monitoring Activities *Does the process require that records for natural gas storage testing and monitoring activities be maintained for the life of the facility?* (UNGS.RESINITIAL.RECORDSRET.P) 192.12(c) (API RP1171, Section 7.5)

Underground Natural Gas Storage - Reservoirs - Risk Management for Storage Operations

1. Definition of Risk *How is "risk" defined in the Risk Management Program?* (UNGS.RESRISK.DEFINITION.P) 192.12(d) (API RP1171 Section 8.1)

2. Data Sources and Collection *Does the process require that information be collected and used to determine susceptibility to threats and hazard-related events?* (UNGS.RESRISK.DATASOURCES.P) 192.12(d) (API RP1171 Section 8.3.2)

3. Data Sources and Collection *Do records demonstrate that appropriate data was collected and used to determine susceptibility to threats and hazard-related events?* (UNGS.RESRISK.DATASOURCES.R) 192.12(d) (API RP1171 Section 8.3.2)

4. Evaluation of Threats and Hazards *Does the process require evaluation for potential threats and hazards impacting storage wells and reservoirs?* (UNGS.RESRISK.THREATEVAL.P) 192.12(d) (API RP1171 Section 8.4.2)

5. Evaluation of Threats and Hazards *Do records demonstrate that potential threats and hazards impacting storage wells and reservoir were adequately evaluated?* (UNGS.RESRISK.THREATEVAL.R) 192.12(d) (API RP1171 Section 8.4.2)

6. Threat and Hazard Interaction *Does the process require that information be collected and used to assess threat and hazard interaction?* (UNGS.RESRISK.THREATINTERACT.P) 192.12(d) (API RP1171 Section 8.3.2)

7. Threat and Hazard Interaction *Do records demonstrate that appropriate data is used to assess threat and hazard interaction?* (UNGS.RESRISK.THREATINTERACT.R) 192.12(d) (API RP1171 Section 8.3.2)

8. Exclusion of Threats and Hazards Events *Does the process include provisions for the exclusion of specific hazards or threats events and related threats interactions?* (UNGS.RESRISK.THREATEXCLUDE.P) 192.12(d) (API RP1171 Section 8.4.1)

9. Exclusion of Threats and Hazards Events *Do records demonstrate that the process was followed for the exclusion of specific hazards or threat events and related threats interactions?* (UNGS.RESRISK.THREATEXCLUDE.R) 192.12(d) (API RP1171 Section 8.4.1)

10. Risk Assessment - Consistent Process *Does the process assess risk in a consistent manner and with a consistent methodology?* (UNGS.RESRISK.RISKASSESS.P) 192.12(d) (API RP1171 Section 8.5.2)

11. Risk Assessment - Consistent Process *Do the records demonstrate that the risk assessment was done in a consistent manner and with a consistent methodology?* (UNGS.RESRISK.RISKASSESS.R) 192.12(d) (API RP1171 Section 8.5.2)

12. Risk Assessment - Results Review *Does the process require review of the risk assessment results to determine whether the risk assessment, resulting prioritization, or ranking accurately represents its facilities and the characterization of the risks?* (UNGS.RESRISK.RISKASSESSRESULT.P) 192.12(d) (API RP1171 Section 8.5.2)

13. Risk Assessment - Results Review *Do the records demonstrate that the results of the risk assessment were reviewed to determine whether the risk assessment, resulting prioritization, or ranking accurately represents its facilities and the characterization of the risks?* (UNGS.RESRISK.RISKASSESSRESULT.R) 192.12(d) (API RP1171 Section 8.5.2)

14. Preventive and Mitigative Measures *Does the process require identification and implementation of preventive and mitigative measures to manage risks?* (UNGS.RESRISK.PREVMITIGMETHOD.P) 192.12(d) (API RP1171 Section 8.6.2)

15. Preventive and Mitigative Measures *Do records demonstrate how the preventative and mitigative measures were identified and implemented to reduce risk?* (UNGS.RESRISK.PREVMITIGMETHOD.R) 192.12(d) (API RP1171 Section 8.6.2)

16. Risk Reassessment and Periodic Review *Does the process maintain a continual risk management review and improvement cycle?* (UNGS.RESRISK.REASSESSRVW.P) 192.12(d) (API RP1171 Section 8.7.1)

17. Risk Reassessment and Periodic Review *Do records demonstrate that a continual risk management review and improvement cycle is performed?* (UNGS.RESRISK.REASSESSRVW.R) 192.12(d) (API RP1171 Section 8.7.1)

18. Risk Management Effectiveness Review *Does the process require assessment of the effectiveness of risk monitoring and risk management programs?* (UNGS.RESRISK.RISKMGMTEFFECTIVE.P) 192.12(d) (API RP1171 Section 8.7.1)

19. Risk Management Effectiveness Review *Do records demonstrate how the effectiveness of the risk monitoring and risk management is assessed?* (UNGS.RESRISK.RISKMGMTEFFECTIVE.R) 192.12(d) (API RP1171 Section 8.7.1)

20. Risk Assessment Review & Update Frequency *Does the process require a periodic risk assessment review and updating, and is it on a defined frequency?* (UNGS.RESRISK.RISKASSESSFREQ.P) 192.12(d) (API RP1171 Section 8.7.2)

21. Risk Assessment Review & Update Frequency *Do records demonstrate that the operator performed a risk assessment review and update and that it was performed in accordance with a defined frequency?* (UNGS.RESRISK.RISKASSESSFREQ.R) 192.12(d) (API RP1171 Section 8.7.2)

22. Identifying New Threats and Hazards *If new threats or hazards are identified, or the impact of threats or hazards changes markedly, does the process assess the risk associated with the new conditions and evaluate and prioritize risk management options in accordance with the risk assessment?* (UNGS.RESRISK.NEWTHREATS.P) 192.12(d) (API RP1171 Section 8.7.3)

23. Identifying New Threats and Hazards *Do the records detail the identification of new threats or hazards and how they were evaluated and prioritized in the risk assessment as a result?* (UNGS.RESRISK.NEWTHREATS.R) 192.12(d) (API RP1171 Section 8.7.3)

24. Risk Management Records Retention *Does the process include a risk management records management plan and a records retention schedule?* (UNGS.RESRISK.RISKRECORDS.P) 192.12(d) (API RP1171 Section 8.8)

25. Risk Management Records Retention *Do records demonstrate that the retention schedule and the records management plan were satisfied?* (UNGS.RESRISK.RISKRECORDS.R) 192.12(d) (API RP1171 Section 8.8)

Underground Natural Gas Storage - Reservoirs - Integrity Monitoring

1. Integrity Maintenance - Reservoirs *Do the processes and procedures ensure the ongoing functional integrity of reservoirs in accordance with API RP1171, Sections 9.2 and 11.2.1?* (UNGS.RESINTEG.INTEGRESERVOIRS.P) 192.12(d) (API RP1171 Section 9.2.1)

2. Integrity Maintenance - Reservoirs *Do the records demonstrate that integrity demonstration, integrity verification and monitoring practices are used to maintain ongoing functional integrity of the reservoir(s)?* (UNGS.RESINTEG.INTEGRESERVOIRS.R) 192.12(d) (API RP1171 Section 9.2.1)

3. Integrity Maintenance - Overall *Are there any integrity maintenance activities (i.e. O&M work, well workovers, well-logging, or any integrity verification or monitoring activities) that can be observed during the inspection?* (UNGS.RESINTEG.INTEGOVERALL.O) 192.12(d) (API RP1171 Section 9.2.1)

4. Integrity Maintenance - Site Specific *Do the integrity processes and procedures account for site specific characteristics of the reservoir and wells (API RP1171, Section 9.2.1)?* (UNGS.RESINTEG.INTEGSITESPEC.P) 192.12(d) (API RP1171 Section 9.2.1)

5. Integrity Maintenance - Site Specific *Do records demonstrate that integrity-related site-specific characteristics of the reservoir and wells have been accounted for?* (UNGS.RESINTEG.INTEGSITESPEC.R) 192.12(d) (API RP1171 Section 9.2.1)

6. Risk-Based Evaluation *Does the process use a risk-based approach for developing the integrity demonstration, verification, and monitoring tasks?* (UNGS.RESINTEG.RISKBASEDEVAL.P) 192.12(d) (API RP1171 Section 9.2.2)

7. Risk-Based Evaluation *Do records demonstrate that a risk-based approach was used as the basis for developing the integrity demonstration, verification, and monitoring tasks?* (UNGS.RESINTEG.RISKBASEDEVAL.R) 192.12(d) (API RP1171 Section 9.2.2)

8. Risk-Based Integrity Activities Frequency *Does the process use risk assessments to determine the frequency requirements for integrity demonstration, verification, and monitoring tasks or activities?* (UNGS.RESINTEG.RISKBASEDFREQ.P) 192.12(d) (API RP1171 Section 9.2.2)

9. Risk-Based Integrity Activities Frequency *Do records demonstrate that risk assessments were used to determine the frequency requirements for integrity demonstration, verification and monitoring tasks?* (UNGS.RESINTEG.RISKBASEDFREQ.R) 192.12(d) (API RP1171 Section 9.2.2)

10. Well Integrity Evaluation *Does the process describe how the mechanical integrity of each well that penetrates the storage reservoir and buffer zone or areas influenced by storage operations, including third-party wells, is evaluated?* (UNGS.RESINTEG.WELLINTEGEVAL.P) 192.12(d) (API RP1171 Section 9.3.1)

11. Well Integrity Evaluation *Do records demonstrate the process of evaluating the mechanical integrity of each well that penetrates the storage reservoir and buffer zone or areas influenced by storage operations, including third party wells?* (UNGS.RESINTEG.WELLINTEGEVAL.R) 192.12(d) (API RP1171 Section 9.3.1)

12. Third-Party Well Integrity Data *Does the process detail how, and how frequently, to request well integrity evaluation data from third-party well owner/operators?* (UNGS.RESINTEG.THIRDPARTYWELLS.P) 192.12(d) (API RP1171 Section 9.3.1)

13. Third-Party Well Integrity Data *Do the records demonstrate that well integrity evaluation data from third party well owner/operators were requested, and evaluated, according to the established frequency?* (UNGS.RESINTEG.THIRDPARTYWELLS.R) 192.12(d) (API RP1171 Section 9.3.1)

14. Well Integrity Evaluation Integration into Risk Program *How does the process integrate the well integrity evaluations into the risk management program?* (UNGS.RESINTEG.WELLINTEGRATION.P) 192.12(d) (API RP1171 Section 9.3.1)

15. Well Integrity Evaluation Integration into Risk Program *Do records demonstrate that active well mechanical integrity evaluations included initial and subsequent evaluations as determined using the risk assessment and the information derived from the initial evaluation?* (UNGS.RESINTEG.WELLINTEGRATION.R) 192.12(d) (API RP1171 Section 9.3.1)

16. Well Integrity - Monitoring for Annular Gas *Do the procedures require monitoring for the presence of annular gas by measuring and recording annular pressure and/or annular gas flow on a regular basis?* (UNGS.RESINTEG.WELLANNULAR.P) 192.12(d) (API RP1171 Section 9.3.2)

17. Well Integrity - Monitoring for Annular Gas *Do records demonstrate that the presence of annular gas is monitored according to procedure?* (UNGS.RESINTEG.WELLANNULAR.R) 192.12(d) (API RP1171 Section 9.3.2)

18. Well Integrity - Annular Gas Threshold/Limit *Do the procedures define a threshold or limit for the annular pressure and/or annular gas flow?* (UNGS.RESINTEG.WELLANNULARLIMIT.P) 192.12(d) (API RP1171 Section 9.3.2)

19. Well Integrity - Annular Gas Threshold/Limit *Do records demonstrate that the set threshold or limit for pressure monitoring was not exceeded?* (UNGS.RESINTEG.WELLANNULARLIMIT.R) 192.12(d) (API RP1171 Section 9.3.2)

20. Well Integrity - Annular Gas Threshold/Limit Exceeded *Does the process require that each annular gas occurrence that exceeds operator-defined or regulatory-defined threshold levels be evaluated?* (UNGS.RESINTEG.WELLANNULAREXCEEDED.P) 192.12(d) (API RP1171 Section 9.3.2)

21. Well Integrity - Annular Gas Threshold/Limit Exceeded *Do the records demonstrate that each annular gas occurrence that exceeded operator-defined or regulatory-defined threshold levels was evaluated according to the procedure?* (UNGS.RESINTEG.WELLANNULAREXCEEDED.R) 192.12(d) (API RP1171 Section 9.3.2)

22. Well Integrity - Wellhead Visual Inspection *Does the process require the visual inspection of each wellhead assembly for leaks at least annually?* (UNGS.RESINTEG.WELLVISUALINSPECT.P) 192.12(d) (API RP1171 Section 9.3.2)

23. Well Integrity - Wellhead Visual Inspection *Do the records demonstrate that visual inspections of each wellhead assembly for leaks were conducted in accordance with the procedures?* (UNGS.RESINTEG.WELLVISUALINSPECT.R) 192.12(d) (API RP1171 Section 9.3.2)

24. Well Integrity - Wellhead Visual Inspection *Do field observations confirm that wellhead assembly was visually inspected for leaks?* (UNGS.RESINTEG.WELLVISUALINSPECT.O) 192.12(d) (API RP1171 Section 9.3.2)

25. Well Integrity - Wellhead Valve Testing *Does the procedure describe how to annually test the operation of the master valve and wellhead pipeline isolation valve for proper function and ability to isolate the well?* (UNGS.RESINTEG.WELLHEADVALVETEST.P) 192.12(d) (API RP1171 Section 9.3.2)

26. Well Integrity - Wellhead Valve Testing *Do records demonstrate that the operation of the master valve and wellhead pipeline isolation valve for proper function and ability to isolate the well is being tested according to procedure?* (UNGS.RESINTEG.WELLHEADVALVETEST.R) 192.12(d) (API RP1171 Section 9.3.2)

27. Well Integrity - Wellhead Valve Maintenance *Do the processes and procedures describe the valve maintenance program for maintaining, repairing, and replacing isolation valves?* (UNGS.RESINTEG.WELLHEADVALVEMAINT.P) 192.12(d) (API RP1171 Section 9.3.2)

28. Well Integrity - Wellhead Valve Maintenance *Do records demonstrate that valves are maintained, repaired, or replaced in accordance with the valve maintenance program for isolation valves?* (UNGS.RESINTEG.WELLHEADVALVEMAINT.R) 192.12(d) (API RP1171 Section 9.3.2)

29. Well Integrity - Subsurface Safety Valve Testing *Do procedures explain how surface and subsurface safety valve systems, where installed, are annually function-tested in accordance with manufacturer's specifications and the operator's procedures?* (UNGS.RESINTEG.WELLSSSVTEST.P) 192.12(d) (API RP1171 Section 9.3.2)

30. Well Integrity - Subsurface Safety Valve Testing *Do records demonstrate that surface and subsurface safety valve systems, where installed, are function-tested at least annually and according to procedure?* (UNGS.RESINTEG.WELLSSSVTEST.R) 192.12(d) (API RP1171 Section 9.3.2)

31. Well Integrity - Closed Well Safety Valve *Do the procedures for a closed storage well safety valve require that it must be manually reopened at the site and not done so remotely?* (UNGS.RESINTEG.CLOSEDSAFETYVALVE.P) 192.12(d) (API RP1171 Section 9.3.2)

32. Well Integrity - Closed Well Safety Valve *Do records demonstrate that a closed storage well safety valve was manually reopened and not done so remotely?* (UNGS.RESINTEG.CLOSEDSAFETYVALVE.R) 192.12(d) (API RP1171 Section 9.3.2)

33. Well Integrity - All Observations *Were observed well integrity activities performed adequately and in accordance with established processes? (Reference API RP1171, Section 9)* (UNGS.RESINTEG.WELLINTEGRITY.O) 192.12(d) (API RP1171 Section 9)

34. Well Integrity - Recordkeeping *Do the procedures require that all integrity-related inspections, tests, patrols and analyses be documented?* (UNGS.RESINTEG.RECORDS.P) 192.12(d) (API RP1171 Section 9.8.1)

35. Well Integrity - Recordkeeping *Do records demonstrate that all integrity-related inspections, tests, patrols, and analyses are documented according to procedure?* (UNGS.RESINTEG.RECORDS.R) 192.12(d) (API RP1171 Section 9.8.1)

36. Well Integrity - Record Retention *Do the process and procedures require that the retention period for storage inventory assessments be the "life of the facility"?* (UNGS.RESINTEG.RECORDRETAIN.P) 192.12(d) (API RP1171 Section 9.8.2;API RP1171 Section 9.5)

37. Well Integrity - Record Retention *Do records demonstrate that storage inventory assessments are being retained for the life of the facility?* (UNGS.RESINTEG.RECORDRETAIN.R) 192.12(d) (API RP1171 Section 9.8.2)

Underground Natural Gas Storage - Reservoirs - Site Security & Safety

1. Site Security and Safety - Measures *Is there a process or procedure that describes what security and safety measures are required for each well site?* (UNGS.RESSITE.SECURITY.P) 192.12(d) (API RP1171 Section 10.2.2;API RP1171 Section 10.1;API RP1171 Section 11.9.1)

2. Site Security and Safety - Fences *Do processes describe how fences or enclosures at well sites comply with applicable fire codes and regulations, where applicable?* (UNGS.RESSITE.FENCES.P) 192.12(d) (API RP1171 Section 10.3.2)

3. Site Security and Safety - Fences *Do records demonstrate compliance with applicable fire codes and regulations for control of site ingress and egress, where applicable?* (UNGS.RESSITE.FENCES.R) 192.12(d) (API RP1171 Section 10.3.2)

4. Site Security and Safety - Fences *Are well location areas secure (which may include fences or enclosures, barriers, chains on valves, locks on fence gate, security cameras, etc.), and do fences or enclosures comply with applicable fire codes and regulations?* (UNGS.RESSITE.FENCES.O) 192.12(d) (API RP1171 Section 10.3.2;API RP1171 Section 11.9.1)

5. Signage *Does the process require that there is permanent weatherproof signage installed at each well site?* (UNGS.RESSITE.SIGNAGE.P) 192.12(d) (API RP1171 Section 10.4.1)

6. Signage *Do records demonstrate that there is a sign at each well site?* (UNGS.RESSITE.SIGNAGE.R) 192.12(d) (API RP1171 Section 10.4.1)

7. Signage *Is a permanent weatherproof signage installed at each well site?* (UNGS.RESSITE.SIGNAGE.O) 192.12(d) (API RP1171 Section 10.4.1)

8. Emergency Preparedness/Response Plan *Does the emergency preparedness / emergency response plan address accidental releases, equipment failure, natural disasters, and third-party emergencies?* (UNGS.RESSITE.EMERGPLAN.P) 192.12(d) (API RP1171 Section 10.6.1)

9. Emergency Preparedness/Response Plan *Do records demonstrate that the emergency preparedness/response plan addresses accidental releases, equipment failure, natural disasters, and third-party emergencies?* (UNGS.RESSITE.EMERGPLAN.R) 192.12(d) (API RP1171 Section 10.6.1)

10. Emergency Preparedness/Response Plan - Effectiveness *Does the process require review/evaluation of the emergency preparedness/response plan for effectiveness on a defined frequency?* (UNGS.RESSITE.EMERGPLANEFF.P) 192.12(d) (API RP1171 Section 11.4.2;API RP1171 Section 10.6.1)

11. Emergency Preparedness/Response Plan - Effectiveness *Do records demonstrate that the emergency preparedness/response plan was evaluated for effectiveness and within the defined frequency?* (UNGS.RESSITE.EMERGPLANEFF.R) 192.12(d) (API RP1171 Section 11.4.2;API RP1171 Section 10.6.1)

12. Emergency Preparedness/Response Plan - All *Is an observed emergency preparedness drill or tabletop exercise conducted adequately and in accordance with the established plan?* (UNGS.RESSITE.EMERGPLAN.O) 192.12(d) (API RP1171 Section 10.6.1;API RP1171 Section 11.4.2)

13. Emergency Preparedness/Response Plan - Training *Does the process require training for storage operations and applicable staff in the use of the emergency preparedness/response plan?* (UNGS.RESSITE.ERTRAINING.P) 192.12(d) (API RP1171 Section 11.4.2;API RP1171 Section 10.6.2)

14. Emergency Preparedness/Response Plan - Training *Do records demonstrate that storage facility staff were trained in the use of the emergency preparedness/response plan?* (UNGS.RESSITE.ERTRAINING.R) 192.12(d) (API RP1171 Section 11.4.2;API RP1171 Section 10.6.2)

15. Emergency Preparedness/Response Plan - Training *Was emergency preparedness/response plan training conducted adequately and in accordance with the established process?* (UNGS.RESSITE.ERTRAINING.O) 192.12(d) (API RP1171 Section 11.4.2;API RP1171 Section 10.6.2)

16. Blowout Contingency Plan *Is there a current Blowout Contingency Plan in place?* (UNGS.RESSITE.BLOWOUTPLAN.P) 192.12(d) (API RP1171 Section 10.6.3)

17. Blowout Contingency Plan *Do records demonstrate that the Blowout Contingency Plan was followed according to procedure?* (UNGS.RESSITE.BLOWOUTPLAN.R) 192.12(d) (API RP1171 Section 10.6.3)

18. Blowout Contingency Plan - Review *Does the process define a frequency for review and updating of the Blowout Contingency Plan?* (UNGS.RESSITE.BLOWOUTPLANRVW.P) 192.12(d) (API RP1171 Section 10.6.3;API RP1171 Section 11.4.2)

19. Blowout Contingency Plan - Review *Do records demonstrate that the Blowout Contingency Plan review was implemented/conducted?* (UNGS.RESSITE.BLOWOUTPLANRVW.R) 192.12(d) (API RP1171 Section 10.6.3;API RP1171 Section 11.4.2)

20. Blowout Contingency Plan - Observations *Was the Blowout Contingency Plan followed during drills and tabletop exercises?* (UNGS.RESSITE.BLOWOUTPLAN.O) 192.12(d) (API RP1171 Section 10.6.3)

Underground Natural Gas Storage - Reservoirs - Procedures & Training

1. Construction, Operation, and Maintenance Procedures *Are there procedures in place for the construction, operation, and maintenance of natural gas storage wells and reservoirs used to establish and maintain functional integrity?* (UNGS.RESPROCED.CONSTROPSMAINT.P) 192.12(d) (API RP1171 Section 11.2.1;API RP1171 Section 11.2.2)

2. Construction, Operation, and Maintenance Procedures *Are construction, operations, and maintenance records retained, as required, for both the operator and vendors?* (UNGS.RESPROCED.CONSTROPSMAINT.R) 192.12(d) (API RP1171 Section 11.2.1;API RP1171 Section 11.2.2)

3. Construction, Operation, and Maintenance Procedures - In Place *Do records demonstrate that the Construction, Operation, and Maintenance procedures were in place prior to the development of a new storage facility?* (UNGS.RESPROCED.CONSTROPSMAINT2.R) 192.12(d) (API RP1171 Section 11.2.1)

4. Construction, Operation, and Maintenance Procedures *Are current procedures available and readily accessible to operations, maintenance, and storage personnel?* (UNGS.RESPROCED.CONSTROPSMAINT.O) 192.12(d) (API RP1171 Section 11.2.1)

5. Operations and Maintenance Procedures - Implementation *Do records demonstrate O&M procedures covering storage wells and reservoirs were developed and implemented prior to the commissioning operations?* (UNGS.RESPROCED.OPSMAINTIMPL.R) 192.12(d) (API RP1171 Section 11.3.1)

6. Operations and Maintenance Procedures - Coverage *Do records demonstrate O&M procedures covering storage wells and reservoirs includes all work activities performed by contractors/vendors and the operator's personnel?* (UNGS.RESPROCED.OPSMAINTSCOPE.R) 192.12(d) (API RP1171 Section 11.3.2;API RP1171 Section 11.3.1)

7. Control Room - Interactions and Communications *Does the process or procedure describe the interaction and communication between operations & maintenance personnel and the control room for maintaining reservoir and well functional integrity during normal, abnormal, and emergency conditions?* (UNGS.RESPROCED.CONTROLROOM.P) 192.12(d) (API RP1171 Section 11.7.1)

8. Control Room - Interactions and Communications *Do records demonstrate that there are communications between operations & maintenance personnel and the control room for maintaining reservoir and well functional integrity during normal, abnormal, and emergency conditions?* (UNGS.RESPROCED.CONTROLROOM.R) 192.12(d) (API RP1171 Section 11.7.1)

9. Safety and Environmental Programs - Safeguards *Do the process and procedures incorporate safeguards for the Environment, Safety, and Health into storage design, construction, and operations?* (UNGS.RESPROCED.SFTYENVPROGENV.P) 192.12(d) (API RP1171 Section 11.9.1)

10. Safety and Environmental Programs - Safeguards *Do records demonstrate that safeguards for the Environment, Safety, and Health are incorporated into storage design, construction, and operations?* (UNGS.RESPROCED.SFTYENVPROGENV.R) 192.12(d) (API RP1171 Section 11.9.1)

11. Safety and Environmental Programs - Site Security *Do the process and procedures incorporate safeguards for Site Security into storage design, construction, and operations?* (UNGS.RESPROCED.SFTYENVPROGSECUR.P) 192.12(d) (API RP1171 Section 11.9.1)

12. Safety and Environmental Programs - Site Security *Do records demonstrate that safeguards for Site Security are incorporated into storage design, construction, and operations?* (UNGS.RESPROCED.SFTYENVPROGSECUR.R) 192.12(d) (API RP1171 Section 11.9.1)

13. Management of Change *Do the process or procedures require that changes are accomplished in a controlled manner (use of a Management of Change process)?* (UNGS.RESPROCED.MOC.P) 192.12(d) (API RP1171 Section 11.11.1)

14. Management of Change *Do records demonstrate that changes are made in a controlled manner (and in accordance with the MOC or equivalent process)?* (UNGS.RESPROCED.MOC.R) 192.12(d) (API RP1171 Section 11.11.1)

15. Management of Change - Program Revisions *Does the process require that program documentation, framework, and procedures are revised before the change is implemented?* (UNGS.RESPROCED.MOCREVISE.P) 192.12(d) (API RP1171 Section 11.11.1)

16. Management of Change - Program Revisions *Do records demonstrate that the program documentation, framework and procedures were revised before the change was implemented?* (UNGS.RESPROCED.MOCREVISE.R) 192.12(d) (API RP1171 Section 11.11.1)

17. Training of O&M Personnel - Notify Changes *Does the process require that operating personnel be notified of changes whenever changes are made to the operating procedures specified in API RP1171, Section 11.3?* (UNGS.RESPROCED.TRAINOM.P) 192.12(d) (API RP1171 Section 11.12.2)

18. Training of O&M Personnel - Notify Changes *Do records detail how the MOC process for the notification of changes to the operating procedures was followed?* (UNGS.RESPROCED.TRAINOM.R) 192.12(d) (API RP1171 Section 11.12.2)

19. Training of O&M Personnel - Change Related Training *Does the process require that the operating personnel be trained, and the training documented, whenever changes are made to the operating procedures specified in API RP1171, Section 11.3?* (UNGS.RESPROCED.TRAINOMCHGS.P) 192.12(d) (API RP1171 Section 11.12.2;API RP1171 Section 11.3)

20. Training of O&M Personnel - Change Related Training *Do records demonstrate that operating personnel were trained when an applicable change was made to the operating procedures?* (UNGS.RESPROCED.TRAINOMCHGS.R) 192.12(d) (API RP1171 Section 11.12.2;API RP1171 Section 11.3)

21. Training Records - Retention *What is the established retention interval for training records?* (UNGS.RESPROCED.TRAINRECORDS.P) 192.12(d) (API RP1171 Section 11.13.2;API RP1171 Section 11.13.3)

22. Training Records - Retention *Do records demonstrate that training records retention meets the operator established interval?* (UNGS.RESPROCED.TRAINRECORDS.R) 192.12(d) (API RP1171 Section 11.13.2;API RP1171 Section 11.13.3)

23. Records and Documentation *Does the process include a list of the necessary documents that need to be recorded for compliance with procedures as required in API RP1171, Section 11?* (UNGS.RESPROCED.RECORDSDOC.P) 192.12(d) (API RP1171 Section 11.13.1)

24. Records Retention *Does the process establish a retention interval for all records that satisfy API RP1171, Section 11 requirements and operator requirements?* (UNGS.RESPROCED.RETENTION.P) 192.12(d) (API RP1171 Section 11.13.3)

25. Records Retention *Do records demonstrate that the records retention intervals are followed for the API RP1171 Section 11 requirements and operator requirements??* (UNGS.RESPROCED.RETENTION.R) 192.12(d) (API RP1171 Section 11.13.3)

Underground Natural Gas Storage - Caverns - Geological & Geomechanical Evaluation

1. Geomechanical Properties - Testing Specimens *Does the process for core testing require that ASTM D4543 be used?* (UNGS.CAVERNGEOL.SPECIMENTEST1.P) 192.12(a) (API RP1170, Section 5.4.2.3)

2. Geomechanical Properties - Testing Specimens *Do records for core testing demonstrate that ASTM D4543 was used?* (UNGS.CAVERNGEOL.SPECIMENTEST1.R) 192.12(a) (API RP1170, Section 5.4.2.3)

3. Geomechanical Properties - Testing Specimens *Does the process for triaxial core testing require that the specimen have a length to diameter ratio of 2.0 to 2.5 and a diameter not less than 1-7/8 inches?* (UNGS.CAVERNGEOL.SPECIMENTEST2.P) 192.12(a) (API RP1170, Section 5.4.2.3)

4. Geomechanical Properties - Testing Specimens *Do records demonstrate that triaxial core testing maintained a specimen length to diameter ratio of 2.0 to 2.5 and a diameter not less than 1-7/8 inches?* (UNGS.CAVERNGEOL.SPECIMENTEST2.R) 192.12(a) (API RP1170, Section 5.4.2.3)

5. Geomechanical Properties - Indirect Tension Tests *Does the process require Brazilian indirect tension testing of core samples to meet or exceed the method specified by ASTM D3967?* (UNGS.CAVERNGEOL.TENSIONTEST.P) 192.12(a) (API RP1170, Section 5.4.2.4)

6. Geomechanical Properties - Indirect Tension Tests *Do records indicate that the specific method outlined by ASTM D3967 was met or exceeded? followed?* (UNGS.CAVERNGEOL.TENSIONTEST.R) 192.12(a) (API RP1170, Section 5.4.2.4)

7. Geomechanical Properties - Triaxial Compression Tests *Does the process for triaxial compression testing of cores require that the procedures of ASTM D7012 be followed or exceeded?* (UNGS.CAVERNGEOL.TRIAXIALTEST.P) 192.12(a) (API RP1170, Section 5.4.2.5.1)

8. Geomechanical Properties - Triaxial Compression Tests *Do record demonstrate that ASTM D7012 was used for triaxial compression testing of cores?* (UNGS.CAVERNGEOL.TRIAXIALTEST.R) 192.12(a) (API RP1170, Section 5.4.2.5.1)

9. Geomechanical Properties - Triaxial Creep Tests *Does the process for triaxial creep tests require that the procedure meet or exceed the Triaxial Compression Method specified by ASTM D7070?* (UNGS.CAVERNGEOL.TRIAXIALCREEP.P) 192.12(a) (API RP1170, Section 5.4.2.6)

10. Geomechanical Properties - Triaxial Creep Tests *Do records demonstrate that the process for triaxial creep tests exceed or meet ASTM D7070?* (UNGS.CAVERNGEOL.TRIAXIALCREEP.R) 192.12(a) (API RP1170, Section 5.4.2.6)

11. Geomechanical Properties - Stress Tests *Does the process require procedures that meet or exceed ASTM D4645 if a stress test is performed?* (UNGS.CAVERNGEOL.STRESSTEST.P) 192.12(a) (API RP1170, Section 5.4.4)

12. Geomechanical Properties - Stress Tests *Do records demonstrate that the stress test procedures meet or exceed ASTM D4645?* (UNGS.CAVERNGEOL.STRESSTEST.R) 192.12(a) (API RP1170, Section 5.4.4)

13. Geomechanical Properties - Maximum Pressure Established *Does the process require that maximum pressure be limited to ensure gas containment?* (UNGS.CAVERNGEOL.MAXPRESS.P) 192.12(a) (API RP1170, Section 5.5.6)

14. Geomechanical Properties - Maximum Pressure Established *Do records demonstrate that a maximum pressure was established to ensure gas containment?* (UNGS.CAVERNGEOL.MAXPRESS.R) 192.12(a) (API RP1170, Section 5.5.6)

Underground Natural Gas Storage - Caverns - Well Design

1. Well Design - General *Does the process ensure that the design of the well system will contain the stored gas?* (UNGS.CAVERNWELLDES.WELLDESGEN.P) 192.12(a) (API RP1170, Section 6.1)

2. Well Design - General *Do records demonstrate that the well system was designed to ensure that gas containment is sufficient?* (UNGS.CAVERNWELLDES.WELLDESGEN.R) 192.12(a) (API RP1170, Section 6.1)

3. Conductor Casing Hole Section *Does the design process include that a conductor casing be installed in the first section of the well system?* (UNGS.CAVERNWELLDES.CONDUCTORCASING.P) 192.12(a) (API RP1170, Section 6.2.2)

4. Conductor Casing Hole Section *Do records demonstrate that a conductor casing was installed as the first line of casing for the system?* (UNGS.CAVERNWELLDES.CONDUCTORCASING.R) 192.12(a) (API RP1170, Section 6.2.2)

5. Intermediate Casing Hole Section *Does the design process for domal salts require that two casing strings be set into the salt?* (UNGS.CAVERNWELLDES.INTERMEDCASING.P) 192.12(a) (API RP1170, Section 6.2.4)

6. Intermediate Casing Hole Section *Do records indicate that there are two casing strings set in the domal salt?* (UNGS.CAVERNWELLDES.INTERMEDCASING.R) 192.12(a) (API RP1170, Section 6.2.4)

7. Conductor Casing Design - Driven Conductors *For driven conductor casings, does the design process require that the conductor casing to withstand lithostatic (overburden) pressure at the anticipated setting depth?* (UNGS.CAVERNWELLDES.CONDUCTOR1.P) 192.12(a) (API RP1170, Section 6.3.3)

8. Conductor Casing Design - Driven Conductors *Do records demonstrate that the design of the conductor casing was calculated to withstand lithostatic (overburden) pressures at the anticipated setting depth when it was driven into the ground?* (UNGS.CAVERNWELLDES.CONDUCTOR1.R) 192.12(a) (API RP1170, Section 6.3.3)

9. Conductor Casing Design - Augered Conductors *For augered conductor casings, does the design process require the collapse design of the conductor casing be calculated to withstand the differential pressures during cementing?* (UNGS.CAVERNWELLDES.CONDUCTOR2.P) 192.12(a) (API RP1170, Section 6.3.3)

10. Conductor Casing Design - Augered Conductors *Do records demonstrate that the design of the conductor casing was calculated to withstand differential pressures during cementing?* (UNGS.CAVERNWELLDES.CONDUCTOR2.R) 192.12(a) (API RP1170, Section 6.3.3)

11. Surface Casing Design - Collapse Design *Does the process require that the surface casing be designed to withstand pressures encountered during cementing?* (UNGS.CAVERNWELLDES.SURFCASING1.P) 192.12(a) (API RP1170, Section 6.3.4)

12. Surface Casing Design - Collapse Design *Do records demonstrate that the surface casing was designed to withstand pressures encountered during cementing?* (UNGS.CAVERNWELLDES.SURFCASING1.R) 192.12(a) (API RP1170, Section 6.3.4)

13. Surface Casing Design - Burst Design *Does the design process require that gas bearing formations be accounted for in the burst design?* (UNGS.CAVERNWELLDES.SURFCASING2.P) 192.12(a) (API RP1170, Section 6.3.4)

14. Surface Casing Design - Burst Design *Do records demonstrate that the burst design of the surface casing account for known gas bearing formations?* (UNGS.CAVERNWELLDES.SURFCASING2.R) 192.12(a) (API RP1170, Section 6.3.4)

15. Surface Casing Design - Bedded Salt Well *For bedded salt well design, does the design process require that the top of the surface casing be based on maximum operating pressure?* (UNGS.CAVERNWELLDES.SURFCASING3.P) 192.12(a) (API RP1170, Section 6.3.4)

16. Surface Casing Design - Bedded Salt Well *For bedded salt well design, do records demonstrate that the design of the top of the surface casing were based on maximum operating pressures?* (UNGS.CAVERNWELLDES.SURFCASING3.R) 192.12(a) (API RP1170, Section 6.3.4)

17. Surface Casing Design - Bedded Salt Well *For bedded salt well design, does the design process require that the bottom of the surface casing be based on the cementing differential pressures?* (UNGS.CAVERNWELLDES.SURFCASING4.P) 192.12(a) (API RP1170, Section 6.3.4)

18. Surface Casing Design - Bedded Salt Well *For bedded salt well design, do records demonstrate that the design of the bottom of the surface casing handle cementing differential pressures?* (UNGS.CAVERNWELLDES.SURFCASING4.R) 192.12(a) (API RP1170, Section 6.3.4)

19. Intermediate Casing Design - Collapse Pressure *Does the design process require that the collapse pressure of the intermediate casing be designed to the casing cementing pressures?* (UNGS.CAVERNWELLDES.INTERMEDCASING1.P) 192.12(a) (API RP1170, Section 6.3.5)

20. Intermediate Casing Design - Collapse Pressure *Do records demonstrate that the collapse pressure of the intermediate casing was designed to withstand casing cementing pressures?* (UNGS.CAVERNWELLDES.INTERMEDCASING1.R) 192.12(a) (API RP1170, Section 6.3.5)

21. Intermediate Casing Design - Burst Pressure *Does the design process require that the burst pressure of the intermediate casing be based on maximum operating pressure for the top portion and on cementing differential pressures for the bottom portion of the casing?* (UNGS.CAVERNWELLDES.INTERMEDCASING2.P) 192.12(a) (API RP1170, Section 6.3.5)

22. Intermediate Casing Design - Burst Pressure *Do records indicate that the burst pressure design account for maximum operating pressure and cementing differential pressures?* (UNGS.CAVERNWELLDES.INTERMEDCASING2.R) 192.12(a) (API RP1170, Section 6.3.5)

23. Intermediate Casing Design - Welding *Does the design process have welding and inspection procedures developed if the intermediate casing has welded connections?* (UNGS.CAVERNWELLDES.INTERMEDCASING3.P) 192.12(a) (API RP1170, Section 6.3.5)

24. Intermediate Casing Design - Welding *Do records demonstrate that welding and inspections procedures were developed for welded connections of the intermediate casing?* (UNGS.CAVERNWELLDES.INTERMEDCASING3.R) 192.12(a) (API RP1170, Section 6.3.5)

25. Intermediate Casing Design - Welded NDT *Does the design process require welded connections be inspected by X-ray or NDT methods if there are welded connections for the intermediate casing?* (UNGS.CAVERNWELLDES.INTERMEDCASING4.P) 192.12(a) (API RP1170, Section 6.3.5)

26. Intermediate Casing Design - Welded NDT *Do records demonstrate that welded connections were inspected by X-ray or NDT methods for welded intermediate casing?* (UNGS.CAVERNWELLDES.INTERMEDCASING4.R) 192.12(a) (API RP1170, Section 6.3.5)

27. Production Casing Design - Strength *Does the design process for the tensile, collapse and burst strengths follow the requirements of API 1170, Section 6.3.6 for production casing?* (UNGS.CAVERNWELLDES.PRODCASING1.P) 192.12(a) (API RP1170, Section 6.3.6)

28. Production Casing Design - Strength *Do records demonstrate that the design of the production casing met the requirements of API 1170 Section 6.3.6?* (UNGS.CAVERNWELLDES.PRODCASING1.R) 192.12(a) (API RP1170, Section 6.3.6)

29. Production Casing Design - Welded Connections *Does the design process require that welded connections be used for the production casing?* (UNGS.CAVERNWELLDES.PRODCASING2.P) 192.12(a) (API RP1170, Section 6.3.6)

30. Production Casing Design - Welded Connections *Do records demonstrate that welded connections were used for the production casing?* (UNGS.CAVERNWELLDES.PRODCASING2.R) 192.12(a) (API RP1170, Section 6.3.6)

31. Production Casing Design - Welded NDT *Does the design process require welded connections to be inspected by X-ray or NDT methods if there are welded connections for the production casing?* (UNGS.CAVERNWELLDES.PRODCASING3.P) 192.12(a) (API RP1170, Section 6.3.6)

32. Production Casing Design - Welded NDT *Do records demonstrate that welded connections were inspected by X-ray or NDT methods for the welded production casing?* (UNGS.CAVERNWELLDES.PRODCASING3.R) 192.12(a) (API RP1170, Section 6.3.6)

33. Wellhead Design *Does the design process for the wellhead meet requirements of API RP1170, Section 6.4.2?* (UNGS.CAVERNWELLDES.WELLHEAD.P) 192.12(a) (API RP1170, Section 6.4.2)

34. Wellhead Design *Do records demonstrate that the design of the wellhead meets the requirements of API RP1170, Section 6.4.2?* (UNGS.CAVERNWELLDES.WELLHEAD.R) 192.12(a) (API RP1170, Section 6.4.2)

35. Bradenhead Design - Welding Inspection *Does the design process require Bradenhead welded connections be inspected by X-ray or NDT methods?* (UNGS.CAVERNWELLDES.BRADENHEAD.P) 192.12(a) (API RP1170, Section 6.4.5)

36. Bradenhead Design - Welding Inspection *Do records demonstrate that Bradenhead welded connections were inspected by X-ray or NDT methods?* (UNGS.CAVERNWELLDES.BRADENHEAD.R) 192.12(a) (API RP1170, Section 6.4.5)

37. Casing Hanger Design - Fit Inside Bradenhead *Does the design process require the casing hanger to fit in the bowl of the Bradenhead and fully close around the O.D. of the production casing?* (UNGS.CAVERNWELLDES.CASINGHANGER1.P) 192.12(a) (API RP1170, Section 6.4.6)

38. Casing Hanger Design - Fit Inside Bradenhead *Do records demonstrate that the casing hanger fits in the bowl of the Bradenhead to allow full closure around the O.D. of the production casing?* (UNGS.CAVERNWELLDES.CASINGHANGER1.R) 192.12(a) (API RP1170, Section 6.4.6)

39. Casing Hanger Design - Weight *Does the design process for the casing account for the entire weight of the casing string?* (UNGS.CAVERNWELLDES.CASINGHANGER2.P) 192.12(a) (API RP1170, Section 6.4.6)

40. Casing Hanger Design - Weight *Do records demonstrate that the casing hanger was designed to handle the entire weight of the casing string?* (UNGS.CAVERNWELLDES.CASINGHANGER2.R) 192.12(a) (API RP1170, Section 6.4.6)

41. Bradenhead Flange Adapter *Does the design process for the wellhead require that a double studded adapter pack-off flange be used if the Bradenhead Flange has lower pressure rating than the wellhead components above it?* (UNGS.CAVERNWELLDES.ADAPTERFLANGE.P) 192.12(a) (API RP1170, Section 6.4.7)

42. Bradenhead Flange Adapter *Do records indicate that a double studded adapter pack off flange was installed if the Bradenhead flange has a lower pressure rating than the wellhead components above it?* (UNGS.CAVERNWELLDES.ADAPTERFLANGE.R) 192.12(a) (API RP1170, Section 6.4.7)

43. Manual Solution Mining Valves *Does the wellhead design process include suitable pressure rated manual solution mining valves installed for injection and removal of blanket materials?* (UNGS.CAVERNWELLDES.MANUALVALVES.P) 192.12(a) (API RP1170, Section 6.4.11)

44. Manual Solution Mining Valves *Do records indicate that manual valves were installed on the wellhead?* (UNGS.CAVERNWELLDES.MANUALVALVES.R) 192.12(a) (API RP1170, Section 6.4.11)

45. Manual Gas Storage Valves During Conversion *Does the wellhead design process include a manual gas storage valve be placed on the storage wellhead during conversion workover?* (UNGS.CAVERNWELLDES.CONVERSIONVALVES.P) 192.12(a) (API RP1170, Section 6.4.11)

Underground Natural Gas Storage - Caverns - Drilling

1. Drilling Rig Selection *Does the process include the requirements of API 1170, Section 7.1 for rig selection?* (UNGS.CAVERNDRILL.RIGSELECTION.P) 192.12(a) (API RP1170, Section 7.1.1)

2. Drilling Rig Selection *Do records demonstrate that the rig selection was based on API 1170, Section 7.1 criteria?* (UNGS.CAVERNDRILL.RIGSELECTION.R) 192.12(a) (API RP1170, Section 7.1.1)

3. Blow-Out Preventer (BOP) System *Does the process require the use and test of a BOP system to ensure well control during drilling of the pilot hole of each hole section?* (UNGS.CAVERNDRILL.BOP.P) 192.12(a) (API RP1170, Section 7.1.3)

4. Blow-Out Preventer (BOP) System *Do records demonstrate that a BOP system was used and tested to maintain well control during drilling operations?* (UNGS.CAVERNDRILL.BOP.R) 192.12(a) (API RP1170, Section 7.1.3)

5. Drilling Fluid Selection - Halite *Does the process require that a salt saturated drilling fluid to be used when drilling through halite formations?* (UNGS.CAVERNDRILL.DRILLINGFLUID1.P) 192.12(a) (API RP1170, Section 7.2.3)

6. Drilling Fluid Selection - Halite *Do records indicate that a salt saturated drilling fluid was used when drilling through halite formations?* (UNGS.CAVERNDRILL.DRILLINGFLUID1.R) 192.12(a) (API RP1170, Section 7.2.3)

7. Drilling Fluid Selection - Soluble Salts *Does the process require that highly soluble salts be accounted for when selecting a drilling fluid?* (UNGS.CAVERNDRILL.DRILLINGFLUID2.P) 192.12(a) (API RP1170, Section 7.2.3)

8. Drilling Fluid Selection - Soluble Salts *Do records indicate that highly soluble salts were accounted for when selecting a drilling fluid?* (UNGS.CAVERNDRILL.DRILLINGFLUID2.R) 192.12(a) (API RP1170, Section 7.2.3)

9. Production Casing - Cement Bond Log *Does the process allow sufficient time after cementing given before a cement bond log can be run?* (UNGS.CAVERNDRILL.CASINGLOG.P) 192.12(a) (API RP1170, Section 7.4.3)

10. Production Casing - Cement Bond Log *Do records indicate that sufficient time was given before the bond long was completed?* (UNGS.CAVERNDRILL.CASINGLOG.R) 192.12(a) (API RP1170, Section 7.4.3)

11. Cementing - Isolation of Storage Zone *Does the process for cement design provide isolation of the storage zone from all sources of porosity and permeability and secure the casing in the borehole?* (UNGS.CAVERNDRILL.CEMENTZONE.P) 192.12(a) (API RP1170, Section 7.6.1)

12. Cementing - Isolation of Storage Zone *Do records demonstrate that the cement design isolates the storage zone from all sources of porosity and permeability and secures the casing in the borehole?* (UNGS.CAVERNDRILL.CEMENTZONE.R) 192.12(a) (API RP1170, Section 7.6.1)

13. Cementing - Cement to Surface *Does the process require all cemented strings to be cemented to surface?* (UNGS.CAVERNDRILL.CEMENT2SURF.P) 192.12(a) (API RP1170, Section 7.6.1)

14. Cementing - Cement to Surface *Do records indicate that all cemented strings are cemented to surface?* (UNGS.CAVERNDRILL.CEMENT2SURF.R) 192.12(a) (API RP1170, Section 7.6.1)

15. Cementing - Quality and Testing *Does the process require cement quality and testing to meet or exceed API 10A and API 10F?* (UNGS.CAVERNDRILL.CEMENTTEST.P) 192.12(a) (API RP1170, Section 7.6.1)

16. Cementing - Quality and Testing *Do records indicate that cement quality and testing meet or exceed API 10A and API 10F?* (UNGS.CAVERNDRILL.CEMENTTEST.R) 192.12(a) (API RP1170, Section 7.6.1)

17. Cementing - Excess Cement Volume *Does the process require that an excess cement volume be calculated based on the open-hole caliper log?* (UNGS.CAVERNDRILL.CEMENTVOL.P) 192.12(a) (API RP1170, Section 7.6.1)

18. Cementing - Excess Cement Volume *Do records demonstrate that an excess amount of cement volume was calculated based on open-hole caliper log?* (UNGS.CAVERNDRILL.CEMENTVOL.R) 192.12(a) (API RP1170, Section 7.6.1)

19. Casing Centralizers *Does the design process require that casing centralizers be used to center the casing?* (UNGS.CAVERNDRILL.CENTRALIZERS.P) 192.12(a) (API RP1170, Section 7.6.2)

20. Casing Centralizers *Do records demonstrate that casing centralizers were used to achieve the proper placement of cement around the casing?* (UNGS.CAVERNDRILL.CENTRALIZERS.R) 192.12(a) (API RP1170, Section 7.6.2)

21. Production Casing Cement Bond *Does the process ensure that a proper bond be created between the production casing, cement, and the surrounding salt to ensure a seal for containment of pressurized gas?* (UNGS.CAVERNDRILL.CEMENTBOND.P) 192.12(a) (API RP1170, Section 7.6.9)

22. Production Casing Cement Bond *Do records demonstrate that a proper bond was created between the production casing, cement and surrounding salt?* (UNGS.CAVERNDRILL.CEMENTBOND.R) 192.12(a) (API RP1170, Section 7.6.9)

23. Cavern Drilling Completion *Does the process require that all drilling fluid in the wellbore be displaced by clean, fully saturated brine water?* (UNGS.CAVERNDRILL.COMPLETION.P) 192.12(a) (API RP1170, Section 7.7)

24. Cavern Drilling Completion *Do records demonstrate that the wellbore was displaced with clean, fully saturated brine water?* (UNGS.CAVERNDRILL.COMPLETION.R) 192.12(a) (API RP1170, Section 7.7)

Underground Natural Gas Storage - Caverns - Solution Mining

1. Cavern Roof Development *Does the design process require that the roof of the cavern be developed based on detailed planning, modeling and execution?* (UNGS.CAVERNMINE.ROOFDEVEL.P) 192.12(a) (API RP1170, Section 8.2.2.4)

2. Cavern Roof Development *Do records demonstrate that the roof of the cavern was designed based on detailed planning, modeling and execution?* (UNGS.CAVERNMINE.ROOFDEVEL.R) 192.12(a) (API RP1170, Section 8.2.2.4)

3. Cavern Roof Development - Production Casing Cement Curing Time *Does the process allow sufficient time for the production casing cement to reach full compressive strength before pressuring the annular space to the MAOP?* (UNGS.CAVERNMINE.CEMENTCURE.P) 192.12(a) (API RP1170, Section 8.2.3)

4. Cavern Roof Development - Production Casing Cement Curing Time *Do records indicate that there was sufficient time for the production casing cement to reach full compressive strength before pressuring the annular space to the MAOP?* (UNGS.CAVERNMINE.CEMENTCURE.R) 192.12(a) (API RP1170, Section 8.2.3)

5. Cavern Roof Development - Blanket Interface *Does the process require that a blanket material be placed in the roof of the cavern and the blanket-water interface to be carefully monitored and periodically verified with a wireline log along with other methods?* (UNGS.CAVERNMINE.BLANKETINTERFACE.P) 192.12(a) (API RP1170, Section 8.2.3;API RP1170, Section 8.2.2.4)

6. Cavern Roof Development - Blanket Interface *Do records demonstrate that a blanket material was placed in the roof of the cavern and that the blanket-water interface was carefully monitored and periodically verified with a wireline log along with other methods?* (UNGS.CAVERNMINE.BLANKETINTERFACE.R) 192.12(a) (API RP1170, Section 8.2.3;API RP1170, Section 8.2.2.4)

7. Cavern Roof Development - Roof Controls *Does the process require the use of roof controls during reverse circulation so that the salt neck below the casing seat is left intact?* (UNGS.CAVERNMINE.ROOFCONTROLS.P) 192.12(a) (API RP1170, Section 8.2.4.3)

8. Cavern Roof Development - Roof Controls *Do records demonstrate that roof controls were utilized during reverse circulation so that the salt neck below the casing seat remained intact?* (UNGS.CAVERNMINE.ROOFCONTROLS.R) 192.12(a) (API RP1170, Section 8.2.4.3)

9. Cavern Development - Solution Mining Model *Does the design process require that a solution mining model be used to develop the salt cavern?* (UNGS.CAVERNMINE.MININGMODEL.P) 192.12(a) (API RP1170, Section 8.2.5)

10. Cavern Development - Solution Mining Model *Do records demonstrate that a solution mining model was used to develop the salt cavern?* (UNGS.CAVERNMINE.MININGMODEL.R) 192.12(a) (API RP1170, Section 8.2.5)

11. Upper Cavern Development - Roof Growth Controls *Does the design process require that upward roof growth be controlled by planned use of raw water injection points, flow rates, and blanket material positioning?* (UNGS.CAVERNMINE.ROOFGROWTH.P) 192.12(a) (API RP1170, Section 8.3.4)

12. Upper Cavern Development - Roof Growth Controls *Do records demonstrate that upward roof growth was controlled through planned use of raw water injection points, flow rates, and blanket material positioning?* (UNGS.CAVERNMINE.ROOFGROWTH.R) 192.12(a) (API RP1170, Section 8.3.4)

13. Upper Cavern Development - Confirm Roof Shape *Does the design process require that frequent interface logs and sonar surveys be performed to confirm desired roof shape and volume?* (UNGS.CAVERNMINE.ROOFSHAPE .P) 192.12(a) (API RP1170, Section 8.3.4)

14. Upper Cavern Development - Confirm Roof Shape *Do records indicate that frequent interface logs and sonar surveys were used to confirm desired roof shape and volume?* (UNGS.CAVERNMINE.ROOFSHAPE.R) 192.12(a) (API RP1170, Section 8.3.4)

15. ESD Equipment *Does the process used during solution mining require the use of ESD valves?* (UNGS.CAVERNMINE.ESDEQUIP.P) 192.12(a) (API RP1170, Section 8.4.1)

16. ESD Equipment *Do records indicate that ESD valves were used during solution mining?* (UNGS.CAVERNMINE.ESDEQUIP.R) 192.12(a) (API RP1170, Section 8.4.1)

17. Hanging String Sizing *Does the design process require that the hanging string be sized based on the criteria of API 1170, Section 8.4.2.2?* (UNGS.CAVERNMINE.HANGINGSTRING.P) 192.12(a) (API RP1170, Section 8.4.2.2)

18. Hanging String Sizing *Do records demonstrate that the hanging string size is based on the criteria in API 1170, Section 8.4.2.2?* (UNGS.CAVERNMINE.HANGINGSTRING.R) 192.12(a) (API RP1170, Section 8.4.2.2)

19. Hanging String Connections *Does the design process require that hanging string connections be made-up to manufacturer's specifications?* (UNGS.CAVERNMINE.CONNECTIONS.P) 192.12(a) (API RP1170, Section 8.4.2.5)

20. Hanging String Connections *Do records demonstrate that the hanging string connections were made up to manufacturer's specifications?* (UNGS.CAVERNMINE.CONNECTIONS.R) 192.12(a) (API RP1170, Section 8.4.2.5)

21. Fluids Injection Rates *Does the process during mining require fluid injection rates to be metered and recorded?* (UNGS.CAVERNMINE.FLUIDINJECTION.P) 192.12(a) (API RP1170, Section 8.4.3)

22. Fluids Injection Rates *Do records indicate that fluid injection rates were metered and recorded during solution mining?* (UNGS.CAVERNMINE.FLUIDINJECTION.R) 192.12(a) (API RP1170, Section 8.4.3)

23. Instrumentation, Control, and Shutdown Devices *Does the process require that the system components have instrumentation control and shutdown during the solution mining process?* (UNGS.CAVERNMINE.SHUTDOWN.P) 192.12(a) (API RP1170, Section 8.5.1)

24. Instrumentation, Control, and Shutdown Devices *Do records indicate that the cavern system components have instrumentation control and shutdown during the mining process?* (UNGS.CAVERNMINE.SHUTDOWN.R) 192.12(a) (API RP1170, Section 8.5.1)

25. Cavern Overpressure Protection System *Does the process require that OPP be installed if the cavern system is connected to a plant pump with the capacity to increase pressure of the cavern over MAOP?* (UNGS.CAVERNMINE.PRESSPROTECT.P) 192.12(a) (API RP1170, Section 8.5.4)

26. Cavern Overpressure Protection System *Do records demonstrate that OPP was used for the cavern system if the cavern system was connected to a plant pump with the capacity to increase pressure of the cavern over MAOP?* (UNGS.CAVERNMINE.PRESSPROTECT.R) 192.12(a) (API RP1170, Section 8.5.4)

27. Cavern Monitoring *Does the process require that the cavern be monitored throughout the solution mining and debrining processes?* (UNGS.CAVERNMINE.MONITORING.P) 192.12(a) (API RP1170, Section 8.6.1)

28. Cavern Monitoring *Do records demonstrate that the cavern was monitored during the mining and debrining processes?* (UNGS.CAVERNMINE.MONITORING.R) 192.12(a) (API RP1170, Section 8.6.1)

29. Returned Brine Salinity and Chemistry *Does the process require that the salinity of the brine in/out of the cavern be measured during the mining process?* (UNGS.CAVERNMINE.SALINITY.P) 192.12(a) (API RP1170, Section 8.6.5)

30. Returned Brine Salinity and Chemistry *Do records indicate that the salinity of the water in/out of the cavern was/is measured during the mining process?* (UNGS.CAVERNMINE.SALINITY.R) 192.12(a) (API RP1170, Section 8.6.5)

31. Workover to Configure for Gas Storage Service *Does the conversion to gas storage process require that a workover (including a casing inspection of the production casing, installation of the gas storage wellhead, and a mechanical integrity test) is performed?* (UNGS.CAVERNMINE.WORKOVER.P) 192.12(a) (API RP1170, Section 8.8.1)

32. Workover to Configure for Gas Storage Service *Do records indicate that a workover (including a casing inspection, installation of a gas storage wellhead, and a mechanical integrity test) was performed before conversion to gas storage?* (UNGS.CAVERNMINE.WORKOVER.R) 192.12(a) (API RP1170, Section 8.8.1)

33. Inspection of Re-Used Solution Mining Hanging Strings *Does the process require that hanging strings be inspected by a full body electromagnetic and ultrasonic inspection and a thread and coupling inspection if the hanging string were to be reused?* (UNGS.CAVERNMINE.STRINGINSP1.P) 192.12(a) (API RP1170, Section 8.8.2)

34. Inspection of Re-Used Solution Mining Hanging Strings Joints *Does the process require that hanging strings joints or connections that fail the inspection be removed and discarded?* (UNGS.CAVERNMINE.STRINGINSP2.P) 192.12(a) (API RP1170, Section 8.8.2)

35. Inspection of Re-Used Solution Mining Hanging Strings *Do records indicate that an inspection was done on all reused hanging strings and that joints or connections that failed the inspection were removed and discarded?* (UNGS.CAVERNMINE.STRINGINSP.R) 192.12(a) (API RP1170, Section 8.8.2)

36. Cavern Sonar Survey *Does the process require a sonar survey be conducted to verify the final cavern geometry?* (UNGS.CAVERNMINE.SONARSURVEY.P) 192.12(a) (API RP1170, Section 8.8.4;API RP1170, Section 8.10.2.2)

37. Cavern Sonar Survey *Do records indicate that a final sonar survey was conducted to verify the cavern geometry?* (UNGS.CAVERNMINE.SONARSURVEY.R) 192.12(a) (API RP1170, Section 8.8.4;API RP1170, Section 8.10.2.2)

38. Installing the Gas Storage Service Wellhead *Does the process require that any reused components from the wellhead be removed, inspected, and tested prior to re-use for gas storage?* (UNGS.CAVERNMINE.REUSEDCOMP.P) 192.12(a) (API RP1170, Section 8.8.5)

39. Installing the Gas Storage Service Wellhead *Do records demonstrate that any reused components from the wellhead be removed, inspected, and tested prior to re-use in gas service?* (UNGS.CAVERNMINE.REUSEDCOMP.R) 192.12(a) (API RP1170, Section 8.8.5)

40. Installing Debrining Strings - Salvaged Strings *Does the process require that debrining strings of unknown quality (salvaged) be discarded?* (UNGS.CAVERNMINE.DEBRININGSTRING1.P) 192.12(a) (API RP1170, Section 8.8.6)

41. Installing Debrining Strings - Salvaged Strings *Do records demonstrate that debrining strings of unknown quality (salvaged) be discarded?* (UNGS.CAVERNMINE.DEBRININGSTRING1.R) 192.12(a) (API RP1170, Section 8.8.6)

42. Installing Debrining Strings - Testing Connections *Does the process require that each connection of the debrining string be pressure tested?* (UNGS.CAVERNMINE.DEBRININGSTRING2.P) 192.12(a) (API RP1170, Section 8.8.6)

43. Installing Debrining Strings - Testing Connections *Do records demonstrate that each connection of the debrining string were successfully pressure tested?* (UNGS.CAVERNMINE.DEBRININGSTRING2.R) 192.12(a) (API RP1170, Section 8.8.6)

44. Conducting a Mechanical Integrity Test (MIT) *Does the process require that a nitrogen/brine interface MIT be performed to ensure cavern integrity before it is placed into gas service?* (UNGS.CAVERNMINE.CAVERNMIT.P) 192.12(a) (API RP1170, Section 8.8.7)

45. Conducting a Mechanical Integrity Test (MIT) *Do records demonstrate that a nitrogen/brine interface MIT was performed, prior to placing cavern into gas service, to ensure cavern integrity?* (UNGS.CAVERNMINE.CAVERNMIT.R) 192.12(a) (API RP1170, Section 8.8.7)

46. Monitoring During Debrining *Does the process require that the debrining piping be monitored during the debrining process?* (UNGS.CAVERNMINE.MONITORDEBRINE.P) 192.12(a) (API RP1170, Section 8.9.6)

47. Monitoring During Debrining *Do records demonstrate that the debrining piping was monitored during the debrining process?* (UNGS.CAVERNMINE.MONITORDEBRINE.R) 192.12(a) (API RP1170, Section 8.9.6)

48. Existing Cavern Conversions *Does the process ensure that a converted cavern (cavern not initially intended for gas storage) meet the same criteria as a developed natural gas storage cavern and undergo a thorough review as stated in API 1170, Section 8.10?* (UNGS.CAVERNMINE.CONVERTEDCAVERN.P) 192.12(a) (API RP1170, Section 8.10.1)

49. Existing Cavern Conversions *Do records indicate that a converted cavern undergo a thorough review as outlined in API RP1170, Section 8.10?* (UNGS.CAVERNMINE.CONVERTEDCAVERN.R) 192.12(a) (API RP1170, Section 8.10.1)

50. Cavern Enlargement *Does the enlarging process for caverns include the criteria outlined in API 1170, Section 8.12?* (UNGS.CAVERNMINE.ENLARGEMENT.P) 192.12(a) (API RP1170, Section 8.12)

51. Cavern Enlargement *Do records indicate that the cavern was enlarged based on the criteria outlined in API 1170, Section 8.12?* (UNGS.CAVERNMINE.ENLARGEMENT.R) 192.12(a) (API RP1170, Section 8.12)

Underground Natural Gas Storage - Caverns - Gas Storage Operations

1. Maximum Storage Operating Pressure *Does the process establish a maximum and minimum storage operating pressure?* (UNGS.CAVERNOPS.MAOPLIMIT.P) 192.12(b) (API RP1170, Section 9.1)

2. Maximum Storage Operating Pressure *Do records demonstrate that a maximum and minimum operating pressure have been established?* (UNGS.CAVERNOPS.MAOPLIMIT.R) 192.12(b) (API RP1170, Section 9.1)

3. Maximum Storage Operating Pressure - Converted to Wellhead Pressure *If the wellhead is the monitoring point of record for pressure, does the process convert the maximum and minimum pressure at the casing seat to a maximum and minimum wellhead pressure?* (UNGS.CAVERNOPS.MAOPWELLHEAD.P) 192.12(b) (API RP1170, Section 9.1)

4. Maximum Storage Operating Pressure - Converted to Wellhead Pressure *Do records demonstrate that the casing seat pressure was converted to a maximum and minimum wellhead pressure (if the wellhead is the monitoring point of record for pressure)?* (UNGS.CAVERNOPS.MAOPWELLHEAD.R) 192.12(b) (API RP1170, Section 9.1)

5. Wellhead Replacement Prior to Service *Does the process require the replacement of solution mined wellheads before commencing natural gas storage service?* (UNGS.CAVERNOPS.WELLHEADREPL.P) 192.12(b) (API RP1170, Section 9.2.1)

6. Wellhead Replacement Prior to Service *Do records demonstrate that the solution mined wellhead has been changed prior to commencing gas operations?* (UNGS.CAVERNOPS.WELLHEADREPL.R) 192.12(b) (API RP1170, Section 9.2.1)

7. Emergency Shutdown (ESD) Valve *Does the process require that an Emergency Shutdown (ESD) Valve is installed at or near the manual valves (wing valves) to isolate the cavern in the event of an emergency?* (UNGS.CAVERNOPS.ESDVALVE.P) 192.12(b) (API RP1170, Section 9.2.2)

8. Emergency Shutdown (ESD) Valve *Do records demonstrate that ESD valves are installed at or near the manual valves (wing valves) for isolation purposes?* (UNGS.CAVERNOPS.ESDVALVE.R) 92.12(b) (API RP1170, Section 9.2.2)

9. Emergency Shutdown (ESD) Instrumentation Flange *If an instrument flange is located between the wing valve and ESD valve, and it is used to gather real-time pressure data, does the process ensure that the flange is rated for the same pressure as the valves?* (UNGS.CAVERNOPS.ESDFLANGE.P) 192.12(b) (API RP1170, Section 9.2.2)

10. Emergency Shutdown (ESD) Instrumentation Flange *Do records demonstrate that instrument flanges are rated for the same pressure as the valves surrounding the instrument flange?* (UNGS.CAVERNOPS.ESDFLANGE.R) 192.12(b) (API RP1170, Section 9.2.2)

11. Detecting Upset Conditions During Debrining *Does the process require monitoring equipment to detect upset conditions during the debrining process?* (UNGS.CAVERNOPS.UPSETCOND.P) 192.12(b) (API RP1170, Section 9.3.1)

12. Detecting Upset Conditions During Debrining *Do records demonstrate that upset conditions are monitored during the debrining process?* (UNGS.CAVERNOPS.UPSETCOND.R) 192.12(b) (API RP1170, Section 9.3.1)

13. Detecting Upset Conditions During Debrining - ESD *Does the process ensure that monitoring equipment that is used as a warning device be connected to the ESD system to automatically close-in the cavern?* (UNGS.CAVERNOPS.ESDUPSETCOND.P) 192.12(b) (API RP1170, Section 9.3.1)

14. Detecting Upset Conditions During Debrining - ESD *Do records demonstrate that the monitoring devices that are connected to an ESD system are tested on a periodic basis?* (UNGS.CAVERNOPS.ESDUPSETCOND.R) 192.12(b) (API RP1170, Section 9.3.1)

15. Emergency Shutdown (ESD) System *Does the process require an Emergency Shutdown (ESD) system to isolate the cavern and wellhead from any attached piping in an emergency? (UNGS.CAVERNOPS.ESDSYSTEM.P) 192.12(b) (API RP1170, Section 9.3.4)*

16. Emergency Shutdown (ESD) System *Do records demonstrate that an ESD system is installed to isolate the cavern(s) in an emergency? (UNGS.CAVERNOPS.ESDSYSTEM.R) 192.12(b) (API RP1170, Section 9.3.4)*

17. Emergency Shutdown (ESD) System *Do field observations on the presence of monitoring equipment and the ESD system on the cavern and testing/calibration of the monitoring equipment and/or ESD system match with the process and records? (UNGS.CAVERNOPS.ESDSYSTEM.O) 192.12(b) (API RP1170, Section 9.3.4)*

18. Monitoring the Production Casing Annulus *If the production casing annular space is monitored for pressure, does the process ensure that the pressure tap is not inside the wing valve? (UNGS.CAVERNOPS.ANNULUSPRESS.P) 192.12(b) (API RP1170, Section 9.3.5.2)*

19. Monitoring the Production Casing Annulus *Do records demonstrate that there is no pressure tap within the wing valve? (UNGS.CAVERNOPS.ANNULUSPRESS.R) 192.12(b) (API RP1170, Section 9.3.5.2)*

20. Monitoring the Production Casing Annulus *Do field observations related to wellhead configuration, pressure taps, and annulus pressure monitoring match with the process and records? (UNGS.CAVERNOPS.ANNULUSPRESS.O) 192.12(b) (API RP1170, Section 9.3.5.2)*

21. Testing of Gauges, Transmitters, and Safety Devices *Do procedures require the testing and calibrating of wellhead gauges, transmitters, and safety devices to be conducted annually? (UNGS.CAVERNOPS.TESTDEVICES.P) 192.12(b) (API RP1170, Section 9.4.1)*

22. Testing of Gauges, Transmitters, and Safety Devices *Do records demonstrate that wellhead gauges, transmitters, and safety devices are tested and calibrated on an annual basis? (UNGS.CAVERNOPS.TESTDEVICES.R) 192.12(b) (API RP1170, Section 9.4.1)*

23. Replacement of Gauges, Transmitters, and Safety Devices *Does the process require that any malfunctioning equipment/devices be repaired or replaced if it fails testing/calibration?* (UNGS.CAVERNOPS.REPLDEVICES.P) 192.12(b) (API RP1170, Section 9.4.1)

24. Replacement of Gauges, Transmitters, and Safety Devices *Do records demonstrate that any malfunctioning equipment has repaired or replaced?* (UNGS.CAVERNOPS.REPLDEVICES.R) 192.12(b) (API RP1170, Section 9.4.1)

25. Testing or Replacement of Gauges, Transmitters, and Safety Devices *Do field observations of testing, calibration, and/or the repair / replacement of gauges, transmitters, and safety devices match with the procedures and records?* (UNGS.CAVERNOPS.TESTDEVICES.O) 192.12(b) (API RP1170, Section 9.4.1)

26. Workover on a Pressurized Cavern *Are there procedures in place for conducting a well workover with the cavern under pressure?* (UNGS.CAVERNOPS.WORKOVER.P) 192.12(b) (API RP1170, Section 9.5.2.3)

27. Workover on a Pressurized Cavern *Do records demonstrate that procedures were designed to provide for maximum anticipated cavern pressure prior to conducting pressurized workovers?* (UNGS.CAVERNOPS.WORKOVER.R) 192.12(b) (API RP1170, Section 9.5.2.3)

28. Workover on a Pressurized Cavern - Equipment Rating *Does the process ensure that the rig(s) and equipment to be used for the workover is designed for the maximum anticipated pressure?* (UNGS.CAVERNOPS.WORKOVEREQUIP.P) 192.12(b) (API RP1170, Section 9.5.2.3)

29. Workover on a Pressurized Cavern - Equipment Rating *Do records demonstrate that the rig(s) and equipment used for the workover were rated for the maximum anticipated cavern pressure?* (UNGS.CAVERNOPS.WORKOVEREQUIP.R) 192.12(b) (API RP1170, Section 9.5.2.3)

30. Lockout and Tagout Systems *Is there a process for Lockout and Tagout (LOTO) at the storage facility to protect workers from hazardous energy sources?* (UNGS.CAVERNOPS.LOTO.P) 192.12(b) (API RP1170, Section 9.6.8)

31. Lockout and Tagout Systems *Do records demonstrate that the Lockout and Tagout (LOTO) procedures were followed?* (UNGS.CAVERNOPS.LOTO.R) 192.12(b) (API RP1170, Section 9.6.8)

32. Lockout and Tagout Systems *Do field observations of the Lockout and Tagout procedures in use demonstrate that it being properly performed?* (UNGS.CAVERNOPS.LOTO.O) 192.12(b) (API RP1170, Section 9.6.8)

33. Operations & Maintenance (O&M) Procedures *Are there Operation and Maintenance (O&M) Procedures in place to ensure the safe operation and necessary maintenance of the wellhead and cavern to ensure integrity?* (UNGS.CAVERNOPS.OMPROCED.P) 192.12(b) (API RP1170, Section 9.7.1)

34. Operations & Maintenance (O&M) Procedures *Do records demonstrate that Operations and Maintenance (O&M) Procedures were developed and implemented before any activities took place?* (UNGS.CAVERNOPS.OMPROCED.R) 192.12(b) (API RP1170, Sections 9.7.1 and 9.7.4)

35. O&M Procedures - Other Components *Do the O&M Procedures include any other components related to the safe operation and necessary maintenance of the cavern or facility?* (UNGS.CAVERNOPS.OMPROCEDOTHER.P) 192.12(b) (API RP1170, Section 9.7.1;API RP1170, Section 9.6)

36. O&M Procedures - Other Components *Do the records demonstrate that the other components of the O&M or Other Procedures related to the safe operation and necessary maintenance of the cavern or facility were conducted in accordance with the established procedures?* (UNGS.CAVERNOPS.OMPROCEDOTHER.R) 192.12(b) (API RP1170, Section 9.7.1;API RP1170, Section 9.6)

37. Emergency Plans and Procedures *Is there an Emergency Response Plan in place to provide for the safe control or shutdown of the storage facility, including the storage cavern(s), in the event of a failure or other emergency condition?* (UNGS.CAVERNOPS.EMERGPLAN.P) 192.12(b) (API RP1170, Section 9.7.1;API RP1170, Section 9.7.2.1)

38. Emergency Plans and Procedures *Do records demonstrate that the Emergency Response Plan provides for the safe control or shutdown of the storage facility, including the storage cavern(s), in the event of a failure or other emergency condition?* (UNGS.CAVERNOPS.EMERGPLAN.R) 192.12(b) (API RP1170, Section 9.7.1)

39. Blowout Contingency Plan *Is there a Blowout Contingency Plan in place to address an uncontrolled release of gas (loss of well control) from the cavern?* (UNGS.CAVERNOPS.BLOWOUTPLAN.P) 192.12(b) (API RP1170, Section 9.7.3;API RP1170, Section 9.7.1)

40. Blowout Contingency Plan *Do records demonstrate that procedures in the Blowout Contingency Plan were designed to address an uncontrolled release of gas (loss of well control) from the cavern?* (UNGS.CAVERNOPS.BLOWOUTPLAN.R) 192.12(b) (API RP1170, Section 9.7.3;API RP1170, Section 9.7.1)

41. Operations and Maintenance (O&M) Records *Do the O&M Procedures include requirements for records documentation and retention?* (UNGS.CAVERNOPS.OMRECORDS.P) 192.12(b) (API RP1170, Section 9.7.4;API RP1170, Section 9.7.1)

42. Operations and Maintenance (O&M) Records *Do records demonstrate that the required O&M inspections, testing, calibration, and monitoring activities are documented and retained in accordance with the O&M Procedure requirements?* (UNGS.CAVERNOPS.OMRECORDS.R) 192.12(b) (API RP1170, Section 9.7.4;API RP1170, Section 9.7.1)

43. Operations and Maintenance (O&M) Training *Is there a personnel Training Program in place to address normal (routine) operations, abnormal operations, and emergency conditions?* (UNGS.CAVERNOPS.OMTRAINING.P) 192.12(b) (API RP1170, Section 9.7.5;API RP1170, Section 9.7.1)

44. Operations and Maintenance (O&M) Training *Do records demonstrate that the Training Program was designed to address normal (routine) operations, abnormal operations, and emergency conditions?* (UNGS.CAVERNOPS.OMTRAINING.R) 192.12(b) (API RP1170, Section 9.7.5;API RP1170, Section 9.7.1)

Underground Natural Gas Storage - Caverns - Integrity Monitoring

1. Cavern System Integrity Monitoring Program *Is there a formally written Integrity Monitoring Program in place?* (UNGS.CAVERNINTEG.IMPROGRAM.P) 192.12(b) (API RP1170, Section 10.3;API RP1170, Section 10.1)

2. Cavern System Integrity Monitoring Program *Do records demonstrate that the Integrity Monitoring Program has been formally written and implemented?* (UNGS.CAVERNINTEG.IMPROGRAM.R) 192.12(b) (API RP1170, Section 10.3;API RP1170, Section 10.1)

3. Holistic and Comprehensive Approach to Integrity *Is a holistic and comprehensive approach in place for monitoring cavern integrity for design, monitoring, and engineering evaluation?* (UNGS.CAVERNINTEG.IMAPPROACH.P) 192.12(b) (API RP1170, Section 10.2)

4. Holistic and Comprehensive Approach to Integrity *Do records demonstrate that a holistic and comprehensive approach to cavern system integrity has been undertaken?* (UNGS.CAVERNINTEG.IMAPPROACH.R) 192.12(b) (API RP1170, Section 10.2)

5. Cavern System Integrity Monitoring - Methods *Does the process require monitoring of the cavern system to ensure ongoing functional integrity using the monitoring methods listed in RP1170 Section 10.1 Table 1 in the Integrity Monitoring Program?* (UNGS.CAVERNINTEG.IMMETHODS.P) 192.12(b) (API RP1170, Section 10.1;API RP1170, Section 10.3;API RP1170, Section 10.4)

6. Cavern System Integrity Monitoring - Methods *Do records demonstrate that the cavern system is being monitored to ensure ongoing functional integrity?* (UNGS.CAVERNINTEG.IMMETHODS.R) 192.12(b) (API RP1170, Section 10.1;API RP1170, Section 10.3;API RP1170, Section 10.4)

7. Cavern System Integrity Monitoring - Observations *Do field observations verify that the cavern system is being monitored according to procedures and to ensure the continuance of functional integrity?* (UNGS.CAVERNINTEG.IMMETHODS.O) 192.12(b) (API RP1170, Section 10.1;API RP1170, Section 10.3;API RP1170, Section 10.4)

8. Integrity Monitoring Program - Components *Does the Integrity Monitoring Program include identification of cavern systems components to be monitored?* (UNGS.CAVERNINTEG.IMPROGCOMP.P) 192.12(b) (API RP1170, Section 10.3)

9. Integrity Monitoring Program - Components *Do records demonstrate what cavern systems components need to be monitored per the Integrity Monitoring Program?* (UNGS.CAVERNINTEG.IMPROGCOMP.R) 192.12(b) (API RP1170, Section 10.3)

10. Integrity Monitoring Program - Cavern Volume & Inventory *Does the Integrity Monitoring Program require cavern volume and inventory verification?* (UNGS.CAVERNINTEG.IMPROGVOL.P) 192.12(b) (API RP1170, Section 10.3)

11. Integrity Monitoring Program - Cavern Volume & Inventory *Do records reflect that cavern volume and inventory verification have been conducted in accordance with the Integrity Monitoring Program?* (UNGS.CAVERNINTEG.IMPROGVOL.R) 192.12(b) (API RP1170, Section 10.3)

12. Cavern System Integrity Monitoring - Methods 2 *Do records demonstrate that all of the employed integrity monitoring methods are being conducted/applied according to the Integrity Monitoring Program procedure(s)?* (UNGS.CAVERNINTEG.IMMETHODS2.R) 192.12(b) (API RP1170, Section 10.1;API RP1170, Section 10.3;API RP1170, Section 10.4)

13. Integrity Monitoring Program - Frequency *Does the Integrity Monitoring Program require a specific monitoring frequency for each integrity monitoring method employed?* (UNGS.CAVERNINTEG.IMPROGFREQ.P) 192.12(b) (API RP1170, Section 10.3)

14. Integrity Monitoring Program - Frequency *Do records demonstrate that the frequency of cavern integrity monitoring has been followed in accordance with the Integrity Monitoring Program?* (UNGS.CAVERNINTEG.IMPROGFREQ.R) 192.12(b) (API RP1170, Section 10.3)

15. Integrity Monitoring Program - Data Analysis *Does the Integrity Monitoring Program require incorporation of data analysis from inspections and reporting?* (UNGS.CAVERNINTEG.IMPROGDATA.P) 192.12(b) (API RP1170, Section 10.3)

16. Integrity Monitoring Program - Data Analysis *Do records demonstrate that the data from inspections and reporting has been analyzed and incorporated into the Integrity Monitoring Program?* (UNGS.CAVERNINTEG.IMPROGDATA.R) 192.12(b) (API RP1170, Section 10.3)

17. Integrity Monitoring Program - Archiving Results *Is there a process in place to archive results of the Integrity Monitoring Program?* (UNGS.CAVERNINTEG.IMPROGRESULTS.P) 192.12(b) (API RP1170, Section 10.3)

18. Integrity Monitoring Program - Archiving Results *Do records demonstrate that the results of the Integrity Monitoring Program have been properly archived?* (UNGS.CAVERNINTEG.IMPROGRESULTS.R) 192.12(b) (API RP1170, Section 10.3)

19. Integrity Monitoring Program - Effectiveness Reviews *Is there a process to periodically review the effectiveness of the Integrity Monitoring Program and the monitoring methods employed?* (UNGS.CAVERNINTEG.IMPROGEFF.P) 192.12(b) (API RP1170, Section 10.3;API RP1170, Section 10.1)

20. Integrity Monitoring Program - Effectiveness Reviews *Do records demonstrate that the Integrity Monitoring Program and the monitoring methods have been reviewed for effectiveness?* (UNGS.CAVERNINTEG.IMPROGEFF.R) 192.12(b) (API RP1170, Section 10.3;API RP1170, Section 10.1)

Underground Natural Gas Storage - Caverns - Abandonment

1. Cavern Abandonment - Removal of Gas *Does the cavern abandonment process include the evacuation of natural gas, to the extent practicable, with saturated brine or with raw water?* (UNGS.CAVERNABAND.GASREMOVE.P) 192.12(b) (API RP1170, Section 11.3)

2. Cavern Abandonment - Removal of Gas *Do records demonstrate that the cavern has been evacuated to the maximum practicable extent?* (UNGS.CAVERNABAND.GASREMOVE.R) 192.12(b) (API RP1170, Section 11.3)

3. Cavern Abandonment - Long-Term Well Monitoring *Does the cavern abandonment process require a long-term monitoring program for cavern wells that are not plugged?* (UNGS.CAVERNABAND.MONITOR.P) 192.12(b) (API RP1170, Section 11.8)

4. Cavern Abandonment - Long-Term Well Monitoring *Do records demonstrate that a long-term monitoring program was developed and implemented for cavern wells that are not plugged?* (UNGS.CAVERNABAND.MONITOR.R) 192.12(b) (API RP1170, Section 11.8)

5. Cavern Abandonment - Long-Term Monitoring Program *Does the long-term monitoring program for abandoned cavern wells follow the criteria of API RP1170, Section 10.3 for integrity monitoring programs?* (UNGS.CAVERNABAND.MONITORPROG.P) 192.12(b) (API RP1170, Section 11.8;API RP1170, Section 10.3)

6. Cavern Abandonment - Long-Term Monitoring Program *Do records demonstrate that the long-term monitoring program for abandoned cavern wells follows API RP1170, Section 10.3?* (UNGS.CAVERNABAND.MONITORPROG.R) 192.12(b) (API RP1170, Section 11.8;API RP1170, Section 10.3)